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b — book review
c — correspondence
r — case report

e — editorial
MMS — Massachusetts Medical Society
me — medical poem

mp — medical progress
sr — meeting report
mc — miscellany

n — notice
o — obituary
— original note

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THE TURN OF THE CENTURY — AND AFTER*

DAVID CHEEVER, MD†

BOSTON

MY talk this evening to which I have given the above title, I will describe as a fairy tale, dealing like most fairy tales, with events of long ago, for such it seems to me. Imagine me as a prospective student presenting myself in late September of 1897 at the door of the Harvard Medical School on the corner of Boylston and Exeter streets, Boston—a building constructed for the school fourteen years earlier and representing the acme of convenience and suitability and believed to be adequate for at least three generations, yet already having quarters cramped for laboratory studies on account of the vast progress being made in the medical sciences. An impressive white bearded man of responsible appearance greeted me. This was James Skillen, always known as Jim, a former male nurse or operating room orderly at the Massachusetts General Hospital and promoted to be janitor of the medical school when it moved from the old building on North Grove Street to its new quarters. Jim lived in the school, and with his wife, Susie, and daughter, Nellie, ran it most effectively—ably assisted, of course, by the dean and faculty of the school. He knew every student and faculty member and spoke of the latter with entire respect but considerable familiarity, by their first names. Perhaps in contrast a picture should be presented of the great educator under whose direction the medical course was conducted, President Charles W. Eliot. It is impossible to do more than touch upon his influence. Mr. Eliot assumed the presidency of Harvard University in 1869, and immediately evidenced his interest in the medical school and his sense of the unity of the school with other graduate departments to form the university, by attending and presiding at the faculty meetings. It was essentially a proprietary school, with a curriculum of four months of lectures during each of two years. In addition to attendance at exactly

the same lectures in succeeding years, the students were required to spend their additional eight months of each year and one succeeding year in an apprenticeship to some acceptable practitioner, or indeed in one of the very few available house officer posts at the Massachusetts General Hospital or in the recently established Boston City Hospital. It was only necessary for the student to pass perfunctory examinations in five of the nine lecture courses in order to obtain his degree. The school had little or no endowment, and the nine professors and a few assistants were paid from the proceeds of the tickets which were sold for their lectures. Mr. Eliot increased the course to three years of graded instruction, introduced adequate written examinations, advised greater contact of students with patients, in the form especially of section teaching and explained to Professor Henry J. Bigelow, who in faculty meeting with groans deprecated the numerous changes, that the reason they were occurring was because there was a new president. Later came the addition of the fourth year to the curriculum and the requirement of an A.B. degree or its equivalent for admission. Mr. Eliot showed a similar interest in elevating dental education to its appropriate place as a department of general medicine. He urged the systematic teaching of preventive medicine, defended free experimentation and vivisection and promoted the recognition of medical service as a part of the social organization. His contributions to medical education were incalculable.

The first teacher with whom I came in contact was Thomas Dwight, Parkman Professor of Anatomy, one of the men about whom one could say, as did a contemporaneous biographer of a colleague, "He was a legendary Bostonian with all the crushing disadvantages of an assured position, binding tradition and a competence." Dwight graduated in medicine in 1867, and the picture of him showing a dignified, grave teacher with a full beard scarcely suggests the slender active young man who, tradition says, while operations were

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conducted in the amphitheater at the Massachusetts General Hospital under the carbolic vapor of Lister sprayed over the field from a foot-driven machine, was entrusted with a hand atomizer to promote additional efficacy, and as he bobbed up between the members of the operating group to deliver a spray over an area where it appeared to be especially needed, received many a sharp rap

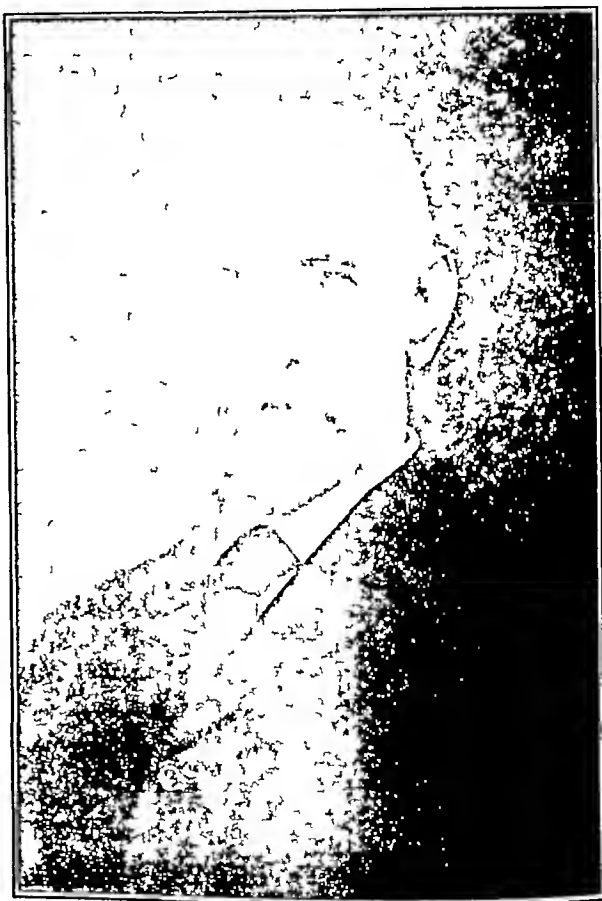


THOMAS DWIGHT

on the cranium or knuckles with the instrument in the hand of the attending surgeon. Dwight studied abroad with Rudinger at Munich, and on his return began to practice medicine and surgery, but his heart was in anatomy; he taught comparative anatomy, histology and embryology and was finally entrusted with the professorship on the retirement of Oliver Wendell Holmes. He was an effective and enthusiastic teacher, he took his duties seriously, and being a man of great faith and spirituality impressed upon his students a sense of the privilege which was accorded to them in dissecting the tenement of clay from which the soul had fled, and obtained from them the respect and decorum appropriate to the occasion. Dwight was a morphologist, and made important researches in the normal variations of the skeleton, and with Mr. Emerton, the artist and technician, he made the superb large scale models of the bones of the skeleton which, with other means devised by him, contributed to the supreme excellence of the instruction in anatomy.

The subject of anatomy should not be closed without speaking of the demonstrator and the assistant demonstrators, a group of young surgeons, enthusiastic and interested in their work because they knew that skill in gross anatomy and dissection was the open sesame to success as surgeons, which perhaps without exception they attained. Nor should mention be omitted of Tom Bonney, the devoted and intelligent preparateur of the anatomical material, whose term of service, begun in 1892, is just now, as this is written, coming to a close.

Simultaneously with Dwight I met another great personality, Charles Sedgewick Minot, professor of embryology. Minot had the same sort of personal background as did Dwight, indeed it was actually he who was described as the "legendary Bostonian" above-mentioned. Minot was a born



CHARLES SEDGEWICK MINOT

naturalist, he studied insects and flowers while still a schoolboy, obtained his degree in science at the Massachusetts Institute of Technology, studied with Ludwig in Leipzig and came home well trained in the biological sciences and in chemistry. No doubt he might have excelled in the latter, but he preferred morphology and mastered the technique of microscopy, he first taught embryology in 1880.

and finally took charge of the Department of Histology and Embryology in 1892, with further promotion to become James Sullman Professor of Comparative Anatomy in 1905. As the scientific world knows, he made an almost unrivaled collection of the embryos of various vertebrates and perfected the microtome, superintended the staining of sections of one hundred and fifty complete series of pig embryos for study by the students, and wrote a standard treatise on embryology. I remember him as a moderately tall, very erect, well-knit figure standing behind the laboratory desk upon which rested his fingertips, describing with great deliberation, and with faultless, clean-cut enunciation, the intricacies of his subject, illustrating it also frequently with graphic diagrammatic drawings on the blackboard, of textbook perfection. He introduced us to a Dutch motto sent to him by Professor Hubrecht of Utrecht, which was displayed in large letters and framed on the wall: *Wat baaten kaers of bril als den uil niet sien uit?* which he translated as follows: "Of what use can light and lenses be if owlets look and will not see?" Minor believed in meticulously ascertaining and recording the student's daily work, he constructed a board looking somewhat like a cribbage board, the holes in which represented the desks of the individual students, and pegs of different colors to represent the instructors, whose personal supervision over the students was thus followed.

The course in physiology introduced me to another teacher of equal notability, Henry Pickering Bowditch, professor of physiology. As one looks at the sedate figure in cap and gown one can scarcely picture him as a brilliant cavalry officer who served throughout the Civil War in the First Massachusetts Cavalry, and who entered Richmond as a major in 1865. Bowditch was a grandson of Nathaniel Bowditch, the mathematician and navigator, and son of a successful Boston merchant, so that he also seems to be one of the legendary Bostonians who made a mark for himself in spite of handicaps of birth. Returning from the war, he graduated in medicine at Harvard in 1868, and then studied in Paris with Claude Bernard and in Leipzig with Carl Ludwig, on returning to Boston he established the first physiological laboratory for students in the United States and engaged in researches in general biology, experimental pharmacology, pathology, psychology and surgery. I remember his emphasis on productive scholarship, his inventiveness, his clear lectures and supplementary recitation periods. He introduced the plan of sending students to the original sources for material for physiological theses. He gave the impression of high breeding and was conspicuous for courtesy, fairness and good

will, and sometimes failed to suppress in a classroom his sense of humor. During his long career as a teacher of physiology he actually established laboratories in three separate buildings: North Grove Street, Boylston Street, and finally in the present buildings on Longwood Avenue. Together with J. Collins Warren, he was more in



HENRY PICKERING BOWDITCH

JOHN COLLINS WARREN

instrumental than any other in planning the expansion of the medical school and enlisting the interest of public spirited men in the project. He was deao of the school from 1883 to 1893. He sought out and brought to Harvard promising men from other universities; he was a public spirited citizen, always to be depended on to help defeat the unwise and to promote the wise in state legislation. The picture displayed of him garbed in cap and gown and seated with Warren at the time of the dedication of the new buildings in 1906 does not do justice to his expressive and interesting face, because it perhaps betrays the existence of the chronic illness which was already spreading its mask over his features.

Chemistry was taught by Edward Stickney Wood, who, having graduated from Harvard College in 1867 and from Harvard Medical School in 1871 and completed a surgical internship at the Massachusetts General Hospital, studied in Berlin and Vienna and began teaching as adjunct

professor to James C White, who was later to enter the field of dermatology Wood became full professor in 1876, though not a genius, he was a remarkable teacher who gave the impression of perfect mastery of his subject Interest was added to his personality by the fact that he was the most famous medical expert witness of his day and was often quoted on the front pages of the daily papers in connection with some murder trial or other medicolegal problem of absorbing interest His students could well believe that as a medical expert witness he was without an equal—cool, calm, impartial and imperturbable under cross-examination It is said that his advice was much relied upon by Mr Eliot

In pathology I was fortunate in having a teacher unusual both in ability and in personality, William Thomas Councilman, who, descended on his father's side from a settler from Holland and on his mother's side from Scotch-English forebears, was the son of a country physician and farmer in Maryland He was a born naturalist, and while working on the farm as a boy made a collection of bones illustrating the comparative osteology of the indigenous vertebrates After studying medicine at the University of Maryland he passed two years abroad with Chiari in Vienna, Cohnheim and Weigert in Leipzig and von Recklinghausen in Strasbourg, and on returning in 1892 joined Welch in teaching pathology at the recently founded Johns Hopkins Medical School He was called to Harvard as the third Shattuck Professor of Pathological Anatomy, succeeding Reginald H Fitz, and became pathologist to the Boston City Hospital, whither he attracted among others Dr Frank B Mallory, weaning him from clinical practice to pathology Councilman was a man of great activity and enthusiasm in teaching and research He promoted the appointment of a full-time pathologist at the Massachusetts General Hospital in 1896, in 1913 he became pathologist to the Peter Bent Brigham Hospital, which had just opened its doors His was a colorful personality, as a biographer states, he "cultivated neither reserve nor mannerisms but achieved dignity by virtue of directness, competence and honesty" He inspired his students with the ambition to become independent observers and thinkers He often acted on impulse regardless of the conventions On one occasion at the Boston City Hospital, having just completed an autopsy he received a telephone message from the superintendent which irritated him, instantly, without coat and vest or collar and necktie, with red suspenders and underwear conspicuous, he rushed across the yard and through the buildings and passageways to "Center" where he had a talk with the astonished and

probably quite reasonable McCollum The photograph of him shows him seated looking reflectively at his dog, Pasco, lying on his desk Pasco was the offspring of a Boston terrier belonging to Louis Pasco, familiar to more than one generation of medical students as the keeper of the morgue at the Boston City Hospital In his last years, after his retirement, Councilman suffered from, but was not cowed by, attacks of angina pectoris, for the relief of which he always carried a bottle of nitroglycerin

Harold Clarence Ernst, professor of bacteriology, was a pioneer in that branch On the paternal side he was descended from a German grandfather who migrated from Prussia during the Napoleonic Wars and married a Boston lady of old New England stock It is not frivolous to record that Ernst, who graduated from Harvard College in 1876, was one of the best amateur base-

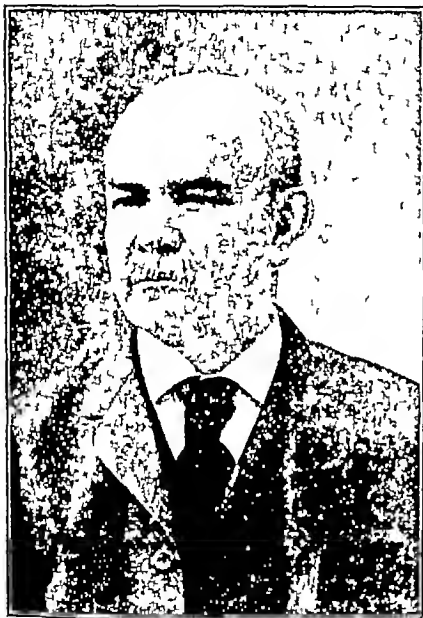


WILLIAM THOMAS COUNCILMAN

ball pitchers of all time, he is said to have added one more to the different types of curves which could be imparted to a thrown ball, and received flattering offers to become a professional After receiving his medical degree in 1880 he studied with Koch in Berlin, and on returning to this country gave six lectures on bacteriology in 1885 at the Harvard Medical School, probably the first lectures on that subject given in a medical school in the United States It was hard work against opposition to establish the importance of bacteriology Ernst developed the first sterilizing apparatus at the Massachusetts General Hospital, and for years supplied from his own little laboratory all the vaccine and antitoxin used by the City of Boston, and also tuberculin for the inoculation of cattle He became first professor of bacteriology in 1895 and held the office until 1922 His students remember him as a tall man, large of frame, of austere and rather stern military appearance, which was much confirmed by his uniform in the World War, which gave him the appearance of a

Prussian military officer. He was an able man of strong character and great courage and devotion to high ideals, which led him to many types of public service and to the laborious editorship of the *Journal of Medical Research*. It was fortunate that the infant subject of bacteriology should have found such a forceful and competent champion.

The theory and practice of physic was taught by the Hersey Professor, Reginald Heber Fitz, who graduated from Harvard College in 1864 and from Harvard Medical School in 1868, and who was then surgical house officer at the Boston City



REGINALD HEBER FITZ

Hospital. Two years were then spent in Europe with Rokitsansky, Oppolzer and Skoda in Vienna and Cornil in Paris, whence he returned to be one of the first to introduce into America Virchow's ideas in regard to cellular pathology. He approached clinical work through the pathological laboratory and autopsy room succeeding John B. S. Jackson as professor of pathological anatomy, becoming visiting physician to the Massachusetts General Hospital in 1887 and finally reaching the obvious objective of Hersey Professor of the Theory and Practice of Physic in 1892. His teaching began just at the establishment of the three full years of instruction with written examinations and the

requirement that every student must pass every course, and just at the beginning of laboratory teaching in physiology and chemistry. He exercised a profound influence on medical education, being chairman of the Committee on Curriculum for many years. He persuaded Henry F. Sears to give the first laboratory in America devoted exclusively to the study and teaching of pathology, housed in an addition to the building on Boylston Street. All the world knows his most conspicuous achievement the demonstration of the responsibility of the appendix for the majority of inflammatory conditions in the right iliac fossa, brought to the attention of the world in a paper entitled "Perforating Inflammation of the Vermiform Appendix," read in 1886 before the Association of American Physicians. This paper gave the first clear picture of the pathology and clinical aspects of the disease and advocated operative interference. Three years later he urged the then startling innovation of the interval operation, and the same year published a paper on acute pancreatitis, which described fat necrosis. These are merely the most striking of his many important contributions. Fitz met the students in a series of systematic lectures and in amphitheater clinics and recitations. The lectures were remarkable as models of clear and precise exposition rapidly delivered at a rate which made it almost impossible to take complete notes. In the clinic he required a student before the class to secure the main features of the history of a patient, make a physical examination, perform or ask information about necessary laboratory tests and then make and defend a diagnosis and suggest treatment. The ability and learning of the man and the precision which he required in observation, interpretation and exposition were not soon forgotten. He permitted the student to fall headlong into the inevitable pitfalls, whence he rescued him with humorous irony which disconcerted the victim but delighted his fellows—a method of pedagogy which Fitz well knew was second to no other in making a lesson unforgettable. He delighted in argument and discussion and waxed more cheerful in opposition, though he was tenacious of nothing but the truth. I always felt admiration and respect, not unmingled with fear until later when I came into more personal relations with him and was able to confirm my suspicions of friendly kindness. A biographer says, "There must be many who owed him their best ideals in medicine."

John Collins Warren, the fourth in the Warren surgical hierarchy, great grandson of the founder of the Harvard Medical School and grandson of one of the founders of the Massachusetts Gen-

eral Hospital, was head of the Department of Surgery After graduation from Harvard University in arts and in medicine, he visited Lister in Glasgow, studied the antiseptic method at the hands of its creator and brought it back to America He was particularly interested in surgical pathology and wrote an admirable textbook on that subject, and as a matter of course, he joined the surgical staff of the Massachusetts General Hospital and the faculty of the Harvard Medical School, and in 1899 was made Moseley Professor of Sur-



FREDERICK CHEEVER SHATTUCK

gery Neither as a surgeon nor as a teacher was he endowed with great genius, but in the former capacity he was courageous, resourceful and thorough, and in the latter he gave much time to the preparation and conduct of his teaching With the traditions of three distinguished generations pointing out his own duty and destiny, his life was a fulfillment of the adage, *Noblesse oblige*, and throughout he was a beacon light of personal distinction, charm and public usefulness With Bowditch he conceived the magnificent project for the new school, and with his happy faculty of securing and sustaining the interest of others he had much to do with securing the necessary support, he was one of the first to advocate the plan for a dormitory He was chairman of the Cancer Commission of Harvard University and secured the

funds for the Collis P Huntington Memorial Hospital The respect and affection in which he was held increased with his years and were in direct proportion to a contemporary's capacity to perceive the elements of true character The continuity of the Warren tradition is a most enviable heritage for the Harvard Medical School and for the medical profession of Boston

The next portrait is that of the professor of clinical medicine, Frederick Cheever Shattuck, obviously another legendary Bostonian with the accompanying handicaps He was the fourth in line of able physicians Perhaps through his many-sided personality, his extraordinary charm and his wisdom he made as deep an impression on succeeding classes of medical students and house officers as did any other of their teachers He had studied in London, Paris and Vienna, and brought home high standards of careful history-taking and of physical examination Something — perhaps it was his very youthful appearance — militated against his immediate success in building up a practice, but he utilized his time to advantage with patients and students in the Out Patient Department of the Massachusetts General Hospital The exercises he conducted were always clinical in character, and it was his actual relation with patients, his sympathetic understanding of their woes, his humorous but never satirical touch, which would best exemplify to the students the methods of the wise physician He was astute in diagnosis and daring in his treatment It was wisely stated that he was a successful psychotherapist long before that term was coined The statement that is said to have been current in some laboratories that medicine can be practiced without seeing the patient was scornfully repudiated by him He was fond of saying that the final test of all diagnostic and therapeutic measures is made at the bedside rather than in the laboratory His fundamental success as a teacher gave authority to his opinion that a full-time teacher, trained only in the laboratory and hospital ward, can impart only a partial knowledge of the practice of medicine His was a picturesque figure as he drove about the city in an open victoria, with a cigarette between his lips, a carnation in his buttonhole, a gaudy waistcoat and with reading matter — medical journals or letters — piled up on the seat beside him, and attended by Hans, the dachshund No better influence did the medical students encounter among their preceptors than that of Shattuck He lived through a period of enormous development in the medical sciences and their application In these matters he was not so much a pioneer as an interpreter and practitioner

Another portrait is presented, that of David Wil-

liams Cheever, because though officially retired from the active teaching staff he was called on by the students to give lectures on special subjects. He graduated from Harvard College in 1852 and from Harvard Medical School in 1858, where he worked hard in the only laboratory course then given, that of anatomy. His proficiency attracted



DAVID WILLIAMS CHEEVER

the attention of Oliver Wendell Holmes, who appointed him to prepare his dissections and made him demonstrator of anatomy—a position which in those days was the most universally accepted steppingstone to surgery. Thus he was ripe for the opportunity offered with the opening of the Boston City Hospital in 1864, and was the first surgeon appointed to its staff and performed the first surgical operation. Medical students were attracted to the new institution, and it is a tribute to his success as a teacher that the professorship of surgery should have passed to him from its legendary home, the Massachusetts General Hospital, on the retirement of Henry J. Bigelow. Cheever's teaching was largely clinical at the hospital but he exemplified the fact that the now somewhat disparaged didactic lecture may be, in good hands, an excellent vehicle of instruction. He was a remarkable lecturer who spoke extemporaneously but after the most careful preparation and

digestion of the subject beforehand. He used no oratorical or elocutionary arts. He did not draw on the blackboard and cultivated no mannerisms to awaken attention. He gave a condensed, lucid, simple, epigrammatic word picture of his subject, so terse and convincing that his hearers could not afford to miss a word. The lecture room was often crowded with men from other exercises or laboratories who gathered as standees behind the seats. The same qualities pervaded his clinical teaching, with the added element of sympathetic understanding which endeared him to both patients and students. He illustrated the doctrine that pedagogy is itself an art, an aptitude for which is born in a teacher and which flourishes with intensive cultivation.

Another surgical teacher who left an indelible impress on his students and other contemporaries was Maurice Howe Richardson, who graduated from Harvard College in 1873 and Harvard Medi-



MAURICE HOWE RICHARDSON

cal School in 1877. He was one of the few teachers of the period, of major reputation, who had neither the alleged disadvantage of the background of a legendary Bostonian nor the advantage of study abroad. He was born in rural Massachusetts in 1851 and approached surgery through the portal of the demonstratorship of anatomy, through which so many subsequently able surgeons had passed. He became a surgeon to outpatients at the Massachusetts General Hospital in 1882, visit

ing surgeon in 1886, assistant professor and professor of clinical surgery and finally Moseley Professor of Surgery, succeeding J Collins Warren, in 1907. The prophetic glow of the antiseptic era burst into full dawn as he entered the field, and with his native talent, amounting almost to genius, his industry, his knowledge of anatomy, his imagination and his ambition, he reaped its full benefits. One of his first great feats was the removal of a denture, impacted in the lower esophagus, by opening the stomach, dilating the cardiac orifice and extracting the denture with finger and forceps. This was, of course, long before the favoring help of the x-ray. He promptly took up the surgery of the vermiform appendix as a coadjutor of his medical colleague Fitz, and played an important part in aiding the profession to perfect the diagnosis and to establish the necessity for early operation. His talents as a teacher were not conspicuous in systematic lectures but rather in spontaneous clinical exercises and demonstrations. He was endowed with many talents and with the priceless capital of perfect health. He played the piano, the flute, the 'cello and the bassoon, he swam for pastime across Vineyard Sound, and lest that seemed easy because the water was warm, he swam the nine miles from Salem to Magnolia. He made freehand sketches on the blackboard, often simultaneously with both hands. He had an enormous practice, and about him hung the inspiring aura of success. His death at sixty-one was premature but enviable, with no premonitory attacks of pain or incapacity, he retired one evening with a mind full of plans for an early operation on the morrow, when his failure to appear at breakfast caused investigation he was found lying quite peacefully in bed, with the coverlet thrown off by one unconscious motion of the arm, made as life merged suddenly into death.

The dean of the school and the professor of obstetrics was William Lambert Richardson, who came of old New England stock and was born in Boston and educated at Harvard, where he graduated in medicine in 1867, and then studied in Vienna and Dublin. Always a general medical practitioner, he was one of the first to specialize in obstetrics, which he began to teach in 1871 as instructor, finally becoming professor in 1886. Of great executive capacity, he resuscitated the old Boston Lying-in Hospital, housed in a single brick house on McLean Street, enlarged it by the addition of adjoining houses, established its school of nursing and finally saw it move to the present building on Longwood Avenue, in close proximity to the Harvard Medical School, where the private ward bears his name. He made this hospital one of the great institutions of its kind in the world.

His was a vigorous personality, of swift accurate sagacity, of few and abrupt words but with the qualities of kindness, cheerfulness, optimism and courage which close acquaintance soon recognized. Richardson, early in his career, lost the sight of one eye through an infection occurring while he was attending a patient with puerperal sepsis, the nurse who assisted him at the same critical case suffered the same calamity as her chief. Students will remember the peculiar fixed expression contributed by the glass eye, and will recall also that so little missed his observation that it was commonly said that "Richardson could see more with one eye than most men with two."

Charles Burnham Porter was born of old New England stock in Rutland, Vermont, in 1840, and having graduated from Harvard College and Harvard Medical School and studied in Europe, approached a surgical career in the classic way through long service as demonstrator of anatomy. He passed through the usual steps in the practice and teaching of surgery at the Massachusetts General Hospital and became professor of clinical surgery. As such he conducted clinical exercises at the hospital and conferences based on theses written by students on particular clinical subjects; he also gave a course on operative surgery on the cadaver at the medical school which, as may be guessed, consisted chiefly of amputations, ligation of vessels, resections of joints and incisions. He was a surgeon of the old precise, anatomical, classical school whose flaps were cut exactly according to rule, and who passed the aneurysm needle always in the direction prescribed by the recognized authorities. In his clinical work, however, he did not allow himself to be handicapped by rules but was progressive and original. His instruction was most useful in inculcating the advantage of meticulous care and accuracy. I once heard him say, in discussing his career, that he had never known what it was to feel tired or ill, and his retirement, when forced by the age limit, seemed unfortunately premature yet he died suddenly not very long thereafter.

No account of my surgical teachers could be considered complete without mention of John Homans, who, though not a member of the regular surgical hierarchy of the medical school, gave special lectures on pelvic tumors. He was, it may be supposed, one of the Boston legendary type with all its handicaps, being of the third successive generation of doctors. He graduated from Harvard Medical School in 1862 just in time, after a surgical internship at the Massachusetts General Hospital, to enter the Navy as assistant surgeon, later he transferred to the Army and at an

absurdly young age was surgeon-in-chief of the First Division of the Nineteenth Army Corps and medical inspector on Sheridan's staff at the battles of Winchester and Cedar Creek. Then he studied a while in Vienna and Paris and came back to practice surgery wherever he could find it — at the Boston Dispensary, the Children's Hospital, the



JOHN HOMANS

Carney Hospital and finally at the Massachusetts General Hospital. He pined the fate of women doomed to a life of increasing helplessness and discomfort by the growth of huge ovarian cysts, and encouraged by the success of occasional operators since MacDowell's first operation at Danville, Kentucky, in 1809, and with the safeguards of the new antiseptic method of Lister, he began operating on these patients, first at the Carney Hospital, because the operation was considered by the authorities of the Massachusetts General Hospital to be unjustifiable on account of its danger. Undeafened by early failures and cheered by a rapidly increasing number of successes, he had performed between 1872 and 1900 the prodigious number of over six hundred ovariectomies, as they were called. It will not surprise readers to learn that he had a personality and methods all his own. I remember the final exercises in the course on ovarian tumors which, though occurring in the teaching amphitheater of the medical school, most unexpectedly appeared to be an operation on a living patient. She was wheeled in on a table fully draped ac-

companied by Homans and the assistants in their full surgical costume. It was quite unexpected to see Tom Bonney, technician in the Department of Anatomy, in the role of anesthetist. The incision was apparently made through the skin, subcutaneous tissue, fasciæ, rectus muscles and peritoneum. Hemostatic forceps were applied and retractors introduced disclosing a large cystic tumor which was tapped with a Spencer Welles trocar, its fluid contents evacuated its flaccid sac drawn out of the abdomen and the pedicle ligated and cut away. Then the mounting suspicions of the students were justified by the removal of the sheets and towels, disclosing the patient as a skeleton, in the pelvis of which had been placed a distended pig's bladder and whose abdominal wall had been constructed of suitable layers of fabrics, including red flannel and chamois skin. It sounds like a crude performance and doubtless would scarcely pass muster nowadays, but it was an astonishingly accurate representation of the successive steps of a classic ovariectomy.

Pediatrics was taught our class in the third year by Thomas Morgan Rotch, who justified the characterization as father of modern scientific infant feeding. He was born in New Bedford, but in his veins ran the blood of distinguished medical forebears in Philadelphia. After graduating from Harvard College and from Harvard Medical School in 1874, he served as medical house officer at the Massachusetts General Hospital, studied for two years in Berlin, Vienna and Heidelberg, and on his return joined in turn the staffs of the Boston Dispensary, the Boston City Hospital, the Children's Hospital and the Infants' Hospital. Lectures on "Certain Diseases of Children" had been given by various incumbents of the chairs of medicine before this, but Rotch's lectures on "The Prognosis, Diagnosis and Treatment of Diseases in Children" emphasized the specialized nature of the subject and led to the establishment, at Harvard Medical School, of the first professorship in pediatrics in this country, to which Rotch was appointed first as assistant professor and later, in 1893, as full professor. It was the pioneer department in America — well organized and conducted — and led to the establishment, in 1891, of the first laboratory in the country for the modification of milk for babies. Rotch published his standard textbook on pediatrics in 1895, and wrote monographs on pericarditis and the roentgenology of bones during growth. His campaign for clean milk and other methods to promote safe artificial infant feeding were at first derided and opposed, but he lived to see them adopted. Invalidism in his immediate family and the tragic loss of an only son might have ruined the career of a less

brave man, whose rather gentle and exquisite personality perhaps failed to give the impression of the courage and determination which helped him reach his objectives

A useful man, an important factor in the effective organization of surgical teaching, was Herbert Leslie Burrell, professor of clinical surgery at the Boston City Hospital, without some of the advantages of his colleagues both in pre-medical education and European study, he succeeded by hard work and ability in bringing to the surgical department some attributes which it might otherwise have lacked. He was a born organizer and demonstrator, and supplemented the work of his more showy fellows to the end that the students might have a comprehensive and complete course. He was a close student of the science of surgery, but was somewhat lacking in the instinctive talents which are vouchsafed to some. He performed successfully such unusual operations as ligation of the innominate artery by meticulous preparation and anticipation of every difficulty. He was prominent in many branches of public service, and in the Spanish-American War he transformed an old freighter into a model hospital ship, the *Bay State*, which was inspected and adopted as an example by foreign observers, and in command of which he made three trips to Cuba. The students smiled at his sententiousness and formality and respected his devotion to the work of teaching them. His untimely death revealed that the handicaps of undeclared illness might have thwarted a less determined man.

It is hard to realize that such an important and sharply defined field as neurology was first mapped out by one of the teachers of this era—James Jackson Putnam. He, too, was a legendary Bostonian, a grandson of James Jackson, co-founder of the Massachusetts General Hospital and first professor of clinical medicine. Educated at Harvard and a house officer in 1869 at the Massachusetts General Hospital, he studied in Leipzig and Vienna under Rokitsansky and Meynert and in England under Hughlings Jackson. On his return he began to lecture in 1872 on nervous diseases and established the first neurological clinic at the Massachusetts General Hospital in one small room of the Out Patient Department. He became a leader in this untried field, and for him was created the chair of diseases of the nervous system. His facilities were so meager that he conducted a neuropathological laboratory in his own home, where he made pioneer studies in organic neurology. As a teacher in a rather difficult field for junior students he was not ideal, since his mind ranged so widely over the various related aspects that it was difficult for him to be a clear expositor

of fundamental principles. As he went on he became much interested in the functional neuroses and psychoanalysis and in speculative philosophy, which he pursued with James, Royce and Bergson. His Shattuck Lecture of 1899, entitled "Not the Disease Only, but Also the Man," is a masterpiece of the doctrine suggested by the title. Like most of his race he was a useful citizen—always ready to serve in the charitable and public enterprises of his fellow-citizens. He had the mental qualities of a man of science and a philosopher. His students appreciated the importance of his teaching more in retrospect after they had personally met the problems of neurology in their experience as practitioners.

It is impossible in the brief time at our disposal to acknowledge in full my debt in the matter of my education, but at least brief tribute must be paid to teachers whose stature was no less than those already mentioned, but whose teaching covered lesser fields. James Clarke White, born in Maine in 1833 of vigorous Ulster stock, and educated at Harvard, was a man of versatile intellectuality embracing natural history, literature and art. After graduation in medicine and as house pupil at the Massachusetts General Hospital in 1856, he studied in Vienna, realizing that Paris had passed its heyday as a medical center. On his return he taught chemistry at the school, joined the medical staff of the hospital, noted the neglect of diseases of the skin and cultivated that study with characteristic genius. For him was created the first chair of dermatology in this country, in 1871, which he held for over forty years. He continued his interest in natural history and prepared an herbarium of the wild flowers of New England, he edited the *Boston Medical and Surgical Journal*, he traveled, he cultivated esthetic interests and literature. His constant influence was toward elevating medical education in general and dermatology in particular, and he was one of the group of younger men on whom President Eliot depended for support in his educational reforms. I remember him as tall, erect, vigorous and white-bearded, conducting his skin clinic with military discipline and efficiency. He raised a neglected branch to the dignity of an important special field.

Oliver Fairfield Wadsworth taught me ophthalmology. He was a legendary Bostonian, born in 1838, educated at Harvard and the Massachusetts General Hospital, and saw service as assistant surgeon, Fifth Massachusetts Cavalry, during the Civil War. At its close he studied ophthalmology for two years at Zurich, and on his return became "visiting ophthalmologist to all the hospitals in Boston where there was an eye service." He was a conscientious teacher and a useful citizen, espe-

cially in the medical community. He is said to have been the first to introduce clinical as well as written examinations into the school, he helped organize the Boston Medical Library and was its clerk and secretary for thirty six years. He was an affectionate, disputatious, cheerful man whose modest personality gave all too little opportunity to the students, during a too brief relation to appreciate his worth.

Charles Montraville Green was William L. Richardson's right hand man in the Department of Obstetrics, and long after my school days succeeded to the professorship of obstetrics, with the added field of gynecology. At the turn of the century he was supplementing his chief's lectures by his characteristically well-planned conferences and practical exercises. His summer course in obstetrics, first established in 1880 was famous for its effective organization and success in affording students an experience at least remotely comparable to a service as intern in a lying-in hospital. Green was a lucid, conscientious, painstaking teacher and able clinician whose service to the medical school for thirty odd years and on the staff of the Boston City Hospital for forty four years influenced the education of an army of living pupils.

Edward Hickling Bradford taught orthopedic surgery. Born in Boston in 1848, he was a vigorous scion of Pilgrim stock, a direct descendant of Governor William Bradford. Educated at Harvard College, Harvard Medical School and the Massachusetts General Hospital he studied abroad for two years, and returning joined the surgical staffs of the Boston City Hospital and the Children's Hospital, where the new specialty of orthopedic surgery attracted his interest. Instruction in this branch was confided to him in 1881, and subsequently he became the first professor of orthopedic surgery. He was a man of gentle but forceful personality, characterized by integrity, devotion to his work, fairness and constancy in all his relations. In his early prime a bicycle accident caused the loss of an eye and serious disfigurement, which with characteristic absence of self-pity he refused to permit to handicap him. For six years, beginning when sixty four years of age, he acted as dean of the school, during the trying period which included the World War. When at seventy five his remaining eye gave out, he learned Braille and continued his quiet, unassuming, indomitable service to the community. Another great example of *noblesse oblige* was Bradford.

Clarence John Blake, professor of otology, was one of the first in this country to make a specialty of otology after the invention of the forehead mirror.

was a kind, responsive and ingenious man whose teaching was replete with interest and fascination far beyond the capacity for appreciation of students in an elementary course.

Franz Pfaff exotic, bearded, bespectacled Teuton taught pharmacology with emphasis on the experimental aspect. Frank Winthrop Draper, scholarly, modest hard working, dependable, a veteran of the Civil War, was appointed the first medical examiner of Suffolk County at the time of the abolishment of the old coroner system and taught legal medicine, the while he served the State on the Board of Health, the Boston City and Children's hospitals as visiting physician and organized medicine as secretary, treasurer orator and president of the Massachusetts Medical Society. Davenport in gynecology, Harrington in hygiene, Hills in chemistry and others too numerous to mention (and omitting the names of those still living) played their lesser but important parts in this educational complex.

A comparison of the medical education at the turn of the century with that of forty years later, when I have completed my allotted contribution to the same cause, would be too long a study, but certain outstanding characteristics are perhaps worth emphasizing. The teaching staff was largely recruited from Boston and New England, and indeed from Harvard University itself. None but the pre-clinical laboratory branches were in charge of full-time teachers, whose salaries were modest enough. Most of the teaching staff of professional rank belonged to that group of legendary Bostonians who had in varying degrees the crushing disadvantages of an assured position binding traditions and a competence" before referred to, yet it is my opinion that their teaching bears comparison both in substance and in spirit with that of their successors of today. Forced—or perhaps privileged—as they were to gain their livelihood from private practice, they nevertheless felt a pride and an interest in their academic responsibilities which made it unthinkable that they should slight them. The young physicians whom they educated to go out into the community to heal the sick learned the art from men who were spending their lives in the same pursuit. Fortunate was the school of the turn of the century that its habitat was a community where, in spite of its comparatively slender resources, it could draw its intellectual and spiritual sustenance from citizens whose ideals and standards of education and public duty were those of colonial New England.

Free use of existing biographical material has been made and is hereby acknowledged.

122 Marlboro Street

INTRA-ABDOMINAL TORSION OF APPENDICES EPIPLOICAE

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TORSION of an epiploic appendix may give rise to acute abdominal symptoms which result in emergency operations. The diagnosis is difficult and is rarely made. The first 16 cases reported in the literature were abstracted by Hunt¹ in 1919. He gave a general discussion of the subject, and included abstracts of cases of appendices epiploicae acting as foreign bodies and also their relation to hernias.

In 1936 Fiske² reviewed the literature and found 26 additional cases, making a total of 42. He added 2 cases from his clinic, in both of which a correct preoperative diagnosis was recorded. Since his article appeared 2 other cases have been reported,³ making a total to date of 46 recorded cases.

Appendices epiploicae are small pouches of peritoneum filled with fat, and are found in one or two rows along the large intestine. On the ascending and descending portions they are located medially, while on the transverse colon they are on the lower part. They are pedunculated and are supplied with small arteries and veins. Their function is not known. They act as a storage place for fat, and they may also facilitate the motion of the large bowel by acting as skids or cushions.

Disease of these structures is very limited. The commonest lesion is twisting of the pedicle with resulting infarction. Infarction, gangrene and strangulation are terms encountered in this connection. The necrotic tab may, perhaps, by becoming attached to the bowel wall give rise to severe cramp-like pain.

The onset of symptoms in cases of infarction is usually sudden and without an obvious predisposing cause. Most frequently the pain is generalized but may become localized. It is sometimes associated with nausea and vomiting. The portions of large bowel involved are about equally divided between sigmoid and cecum.

On examination the patient does not appear ill. He may show signs of discomfort from steady aching or peristaltic pain. Rectal examination may show tenderness on one or both sides. The temperature is only slightly elevated, if at all, but the white blood-cell count may reach 20,000.

Diagnosis is difficult. The entire picture when the pain is on the right side is impossible to distinguish from that of a mild attack of appendicitis.

Among the diagnoses made preoperatively have been cholecystitis, ovarian cyst with twisted pedicle, renal calculus, diverticulitis and intestinal obstruction. When the lesion is on the left side it is more easily recognizable.

Treatment is removal of the necrotic mass after ligating its base, and careful inspection of the bowel wall in order to see that no perforation exists. In one case the mass was left in because of inaccessibility. The patient continued to have pain, spasm and tenderness for ten days.

I have recently seen a patient (Case 6) on whom a preoperative diagnosis of subsiding appendicitis was made but at whose operation a necrotic twisted epiploic appendix was found. In order to determine the frequency of occurrence of this condition I have examined the case records of the Massachusetts General Hospital and have found only 5 other cases. In none of these was a correct diagnosis made.

CASE 1 (W. S. 175356) The patient, a 36-year-old man, was admitted April 4, 1911. Twenty-four hours previously he had developed sudden severe pain in the right lower quadrant of the abdomen. There was no radiation and no nausea or vomiting. The patient went to bed and applied an ice bag. He had chills and fever all day.

Examination on admission showed slight spasm in the right upper quadrant. There was marked spasm in the right lower quadrant, with some tenderness. No masses were felt. The temperature was 99°F, the pulse 62, the respirations 20, and the white-cell count 12,600. The urine was normal.

The preoperative diagnosis was appendicitis. At operation a necrotic mass the size of a small apple was found on the cecum. This was removed and an appendectomy was performed. The pathological laboratory reported peri-appendicitis and infarction of an epiploic appendix.

CASE 2 (E. S. 193799) The patient, a 28-year-old woman, was admitted February 19, 1914. She had had an attack of pain in the bladder region 16 years previously, of 5 days duration. Four months later she had fever, accompanied by pain in the left upper quadrant of the abdomen, for 2 weeks. There was some nausea and vomiting. Several subsequent attacks of pain in the abdomen occurred, coming at night and lasting for 1 hour. Three days before admission the patient was awakened by pain in the right lower quadrant. There was no radiation, but the pain was severe enough to double her up. It gradually diminished but fluctuated in intensity. There was no nausea or vomiting.

Examination revealed a round, soft, tympanic abdomen. There was marked tenderness in the left flank and slight tenderness in the right lower quadrant. No masses and no spasm were felt. An appendectomy was per-

formed and a calcareous epiploic appendix was removed from the sigmoid. The pathological laboratory reported chronic appendicitis and gangrene of an epiploic appendix.

CASE 3 (E. S. 196336) The patient a 32-year-old man was admitted June 30, 1914. About 24 hours previously he had begun to have sharp pain throughout the lower abdomen. This lasted about 2 hours and was accompanied by nausea and vomiting. He went to work the following day but had another attack in the afternoon lasting 1 hour. A few hours later he had a third attack, which was more severe than the previous two. It was characterized by severe knife-like pain in the right lower quadrant of the abdomen.

Examination revealed a soft, tympanitic abdomen. There was no spasm or rigidity. There was tenderness in

cus. There was some tenseness of the muscles. The rectal and pelvic examinations were negative. The temperature was 98.6 F., the pulse 86 and the white-cell count 10,200. The urine was normal. The preoperative diagnosis was acute appendicitis.

At operation a strangulated epiploic appendix was found over the base of the vermiform appendix. Both were removed. The postoperative diagnosis was infarction of an epiploic appendix.

CASE 5 (E. S. 14999) The patient a 46-year-old man was admitted January 27, 1937 complaining of generalized abdominal pain of 30 hours duration. There was no nausea or vomiting but the patient could not eat because of persistent abdominal cramps. He took a tablespoonful of castor oil and was awakened in the night with generalized cramps. A second dose was followed in

TABLE 1 Summary of Clinical Data

| CASE NO. | AGE | SEX | LOCALITY | ONSET | OTHER SYMPTOMS | TEMP. F. | WHITE CELL COUNT $\times 10^3$ | LOC. SIG. | PREOPERATIVE DIAGNOSIS | LOCATION OF LESION | TREATMENT | RESULTS |
|----------|-----|-----|-------------|-------|----------------|----------|--------------------------------|------------------------------|--|-------------------------------------|---|--|
| 1 | 31 | M | R. L. Q. | 24 hr | Chills | 99.4 | 12.6 | Spasm | Appendicitis | Cecum | Appendectomy and removal of epiploic appendix | Relieved |
| 2 | 28 | F | R. L. Q. | 16 hr | No vomiting | 99.4 | — | Tenderness | Appendicitis | Sigmoid | Appendectomy and removal of epiploic appendix | Relieved |
| 3 | 32 | M | Generalized | 28 hr | No vomiting | 99.4 | 70.0 | Tenderness (R. L. Q.) | Appendicitis | Sigmoid | Laparotomy | Pain and tenderness with mass in left lower quadrant, for 10 days. |
| 4 | 57 | F | R. L. Q. | 24 hr | None | 98.6 | 10.1 | Tenderness (R. L. Q.) | Appendicitis | Cecum | Appendectomy and removal of epiploic appendix | Relieved |
| 5 | 40 | M | General | 30 hr | None | 99.5 | 15.2 | Tenderness (R. L. Q.) | Intestinal obstruction, diverticulitis, appendicitis | Attached to ileum (origin doubtful) | Removal of necrotic mass adherent to ileum | Relieved |
| 6 | 70 | M | L. L. Q. | 30 hr | None | 99.2 | 11.2 | Tenderness, spasm (L. L. Q.) | Appendicitis | Sigmoid | Appendectomy and removal of epiploic appendix | Relieved |

the left lower quadrant. There was also some pain over McBurney's point. No masses were felt. Rectal examination showed tenderness on both sides. The temperature was 99.2 F. the pulse 100 the respirations 20 and the white-cell count 20,000. The preoperative diagnosis was acute appendicitis.

Exploration revealed a slight kink in the vermiform appendix but no inflammation and an inflamed infiltrated mass attached to the sigmoid. Because of its inaccessibility it was not removed. An appendectomy was performed. The postoperative diagnosis was strangulated epiploic appendix. The patient continued to have pain with some spasm in the left lower quadrant for 10 days.

CASE 4 (W. S. 305485) The patient, a 57-year-old woman was admitted January 18, 1935 complaining of soreness in the right lower quadrant of the abdomen. This had come on suddenly about 24 hours before entry. She took a laxative and had two small bowel movements without any increase in pain. There was no nausea and no urinary symptoms. The pain persisted but was not severe enough to keep her awake or interfere with her appetite.

On examination the abdomen was pendulous and there was a tender point to the right of and below the umbilicus.

7 hours by a profuse bowel movement, the first in 2 days. The cramps persisted and the patient was admitted to the hospital.

On examination the abdomen was soft. There was some distention of the cecum and ascending colon. There was no mass or spasm. There was localized tenderness in the right lower quadrant. Rectal examination showed tenderness high on both sides. The temperature was 99.5 F. and the white-cell count 15,200. The urine was normal. The preoperative diagnosis was possible partial obstruction, possible diverticulitis and possible acute appendicitis.

Exploration showed the vermiform appendix to be normal. On freeing the cecum a loop of ileum was brought up and a piece of hemorrhagic tissue measuring 3 by 4 cm was found attached to it. It had apparently become separated from the colon and attached itself to the ileum. It was readily freed and the wound was closed without drainage after removal of the appendix. The pathological laboratory reported infarction of an epiploic appendix and periappendiceal hemorrhage.

CASE 6 (private case) The patient, a 20-year-old man was seen January 17, 1938. He had been perfectly well until 30 hours previously when after eating a small bur-

ried lunch he immediately felt a dull pain in the left lower quadrant of the abdomen. This persisted through the night and gradually became worse. The pain was not severe enough to double him up but was enough to make him consult his physician. There was no nausea, vomiting, urinary disturbance, change in bowel habits or melena. The patient had had no previous similar attacks. The past history was negative except for removal of a semilunar cartilage 1 year previously.

Examination revealed a well-developed and healthy appearing man. The abdomen was flat. There was slight tenderness over McBurney's point. In the left lower quadrant there was marked tenderness with muscular spasm. There was also slight spasm in the right lower quadrant. There was no pain on leg raising, but some pain on the left with hyperextension of the right leg. Rectal examination showed some tenderness on both sides, but it was more marked on the left. There was some fecal material in the rectum. The urine was normal. The temperature was 99.2°F, the pulse 84, the respirations 20, and the white-cell count 11,000.

It was thought that appendicitis was likely, although the symptoms were somewhat atypical, and the patient was admitted. An enema caused some pain and was discontinued. The white-cell count a few hours later was 9600. The following day the enema was repeated with less discomfort. The white-cell count dropped to 6300, and the pain and tenderness were much less marked. A flat x-ray film of the abdomen was negative. In the afternoon the pain and tenderness increased and the pain became peristaltic in character. A barium enema was given. There was some pain when the colon was partially filled, but spasm and diverticula were not demonstrated. The appendix was not seen. The patient was then given a motor meal and x-ray photographs were taken at intervals. No Meckel's diverticulum was seen. The appendix was visualized and was seen to contain many fecoliths. In view of the fact that the patient was employed on a ship, it was decided to explore the abdomen.

On opening the peritoneum a firm nodule measuring about 2 by 2 cm was felt in close relation to the sigmoid. It was delivered without difficulty and found to be a gangrenous epiploic appendix. It had become twisted on its pedicle and was adherent to the sigmoid. This mass was freed and its pedicle ligated and excised. There were some adhesions around the cecum. A kinked and thickened vermiform appendix was removed.

Convalescence was uneventful, and there has been no recurrence of symptoms.

Presentation of 6 additional cases of torsion of appendices epiploicae brings the total reported to 52. There were 29 men and 23 women. The age incidence varied from twenty to seventy, the average age of this series is thirty-five. In the published cases there were 5 in whom the condition was an incidental finding. In the others,

acute symptoms were present which necessitated operation.

Pain is the commonest symptom. It is usually sudden in onset and varies from moderate to severe. It is often peristaltic in character. Localized tenderness may be present, with or without spasm. The temperature is slightly elevated, and the white-cell count may reach 20,000.

There were 6 deaths in the cases reported in the literature. In 2 of these the torsion was an incidental finding at autopsy, 1 patient having died of acute hemorrhagic pancreatitis and 1 of cardiac failure. In 4 cases, however, death was definitely related to torsion of an epiploic appendix. In 1 case reported by Riedel⁴ the patient had intestinal obstruction and died from peritonitis the day after operation. In Ebner's⁵ case death occurred on the seventh postoperative day and was due to paralytic ileus secondary to interference with the blood supply from the torsion. Seelye⁶ reports a death due to generalized peritonitis a few days after drainage of an abscess caused by a twisted gangrenous epiploic appendix. Baumeister, Hargens and Morsman⁷ report a death from intestinal obstruction due to adhesions between appendices epiploicae.

SUMMARY AND CONCLUSION

Only 46 cases of torsion of an epiploic appendix have been reported.

The symptoms and signs of appendicitis are closely simulated.

The preoperative diagnosis is rarely made.

Six additional cases are summarized.

Vague abdominal pain is probably often due to an unrecognized strangulated epiploic appendix.

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LUNG ABSCESS*

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ANY disease which is chiefly a complication of other medical and surgical conditions, and therefore presumably in some measure controllable by the management of those conditions, deserves exhaustive investigation, especially when the disease still gives rise to a reported mortality in treated cases of 30 to 50 per cent.^{1-9, 22-27}

Diagnosis of nontuberculous abscess of the lung is relatively simple. It is rather a problem of treatment and, even more significantly, of prevention. Intelligent treatment is based on an accurate understanding of the pathology and the pathologic physiology involved, and any program of prophylaxis must presume some knowledge of etiology, bacteriology and precipitating incidents.

ETIOLOGY

There are three possible pathways of infection to the lung parenchyma besides direct contamination incident to trauma. These are the trachea and bronchial tree, the blood stream and the lymphatics. It seems fairly certain that the lymphatic route must be rare, though occasionally it may be of significance in bringing infection from a focus in surrounding tissue. That infection frequently reaches the parenchyma through the bronchi is generally conceded, and it seems probable that it is carried there by the blood stream more often than is clinically suspected.

Cutler and his associates¹⁰⁻¹¹ found many years ago that they could produce lung abscess in dogs by releasing in the venous circulation an embolus consisting of a small section of a tiny vein filled with organisms. Their findings led them to believe that embolism from the operative wound and local immune reactions in the lung were the important factors in postoperative lung abscess. Feterolf and Fox¹² studied tonsillectomy wounds in dogs and found hemorrhages, thrombi, necroses and bacteria present in the surrounding tissue. Because the muscular pharynx can never be put at rest, they believed that thrombi were readily discharged, resulting in pulmonary infarcts which subsequently became infected with organisms from the upper respiratory tract. Many of these pulmonary infarcts probably escape notice because of

their small size, sterile character and prompt resolution. Castleman⁶ and Hampton¹³ on the basis of correlated postmortem x-ray and anatomical studies, have expressed the belief that incomplete pulmonary infarction is much more frequent than was previously suspected.

Recent investigators have been able to produce lung abscess readily by injecting infected material into the bronchi. Weiss¹⁴ for instance, has done it repeatedly in monkeys by inserting a mixture of agar and anaerobic organisms obtained from lung abscesses at operation into the bronchus of the left lower lobe. His evidence suggests that aspiration of infected material, together with plugging of the bronchus, is responsible for abscess formation.

Clinically it is often impossible to establish whether an embolus or aspiration is the origin, but it seems probable that the latter route is usually responsible. The bacteriological flora of a well developed abscess is qualitatively very similar to that of the unhygienic oral cavity. It is difficult to see how a septic embolus, from a laparotomy wound, for instance, could give rise to this picture in itself. Where emboli are involved, a sterile or simple primarily infected infarct probably results, and this is secondarily infected by a complication of buccal organisms.

In analyzing the cases of lung abscess at the Boston City Hospital, Freedman¹⁵ concluded that pulmonary atelectasis was the important factor in stagnation of infected material in shut-off portions of the lung. He found that chronic pulmonary conditions such as bronchitis, asthma and bronchiectasis provided fertile soil for acute suppuration. Apparently there must be a primary lesion of some kind in the lung before secondary infection by mouth organisms can take place. This lesion may be due to infarction as a result of an embolus, or atelectasis due to bronchostenosis or obstruction by plugs of secretion. The normal bronchial tree is admirably equipped by its secretions, cilia and reflex cough mechanism to handle the organisms which must constantly descend from the upper respiratory tract, but when this process is disrupted by mechanical factors incident to disease or surgical manipulation, infection is liable to ensue.

PATHOGENESIS

The numerous series of cases of lung abscess reported in the literature all show that the majority of cases follow operations on the upper respiratory tract and pneumonia. Of the 276 cases reported by Freedman,¹⁵ 196 were sequelae of medical conditions and 76 followed operative procedures. The medical causes included pneumonia, chronic cough, influenza, tuberculosis and carcinoma. A large percentage of these cases could ultimately be traced back to the common cold or some other acute process with an intervening atelectasis in the lung. Great numbers of these patients were in poor general condition owing to alcoholism, diabetes or cardiac or peripheral vascular disease, and poor oral hygiene was practically universal. The incidence of lung abscess as a postoperative complication of various operations in this series is shown by the following ratios:

| TYPE OF OPERATION | RATIO |
|---------------------------------|--------------------------|
| Tonsillectomy and adenoidectomy | 1 1654 (1 626 in adults) |
| Tooth extraction | 1 320 |
| Appendectomy | 1 1411 |
| Pelvic surgery | 1 774 |
| Gastric surgery | 1 54 |
| Gall-bladder surgery | 1 258 |

The high incidence of this condition following operations on the upper abdomen, namely the stomach and gall bladder, is especially interesting because it is also true of atelectasis, massive collapse, embolism and other postoperative pulmonary complications.²¹

Of the cases of lung abscess at the Massachusetts General Hospital reported by King and Lord,²² 56 per cent followed operations on the upper respiratory tract and 9 per cent other operations, 23 per cent were insidious in onset, and 8 per cent had a stormy onset following pneumonia. In a series reported from Toronto,³⁷ 30 per cent followed upper respiratory operations, 19 per cent followed pneumonia, 7 per cent were associated with definite pulmonary emboli and 33 per cent were classed as idiopathic. These percentages are representative of many reported series.

The etiologic factors in cases in children have a somewhat different proportion. On examining records of the cases diagnosed as lung abscess at the Boston Children's Hospital during the ten years previous to 1938, it was found that 53 per cent followed tonsillectomy but none followed any other operations, 6 per cent followed the aspiration of foreign bodies and all the rest developed from unresolved pneumonia or severe upper respiratory infection. In all these cases in children it was possible to find some definite precipitating incident. This is a very interesting fact. The bacterio-

logical flora of the buccal cavities of children under ten differs from that of adults in that fusiform bacilli and spirochetes are rarely found and staphylococci are more prevalent.²⁴ In children, oral hygiene is much better and the severe gingivodental infections of the adult ward patient are rare.

Stern,³⁶ at the Mount Sinai Hospital in New York, examined all the cases of lung abscess in which the etiology was unknown, and found that 84 per cent presented a typical and uniform picture of marked dental disease with infected gums and large masses of dental tartar. It is in dental tartar that anaerobic organisms thrive. The tartar when aspirated, Stern believes, acts as an irritating foreign body and therefore facilitates the development of lung suppuration in the presence of infecting organisms. His observations seem sufficiently well controlled to permit the conclusion that oral disease is disproportionately common in patients with abscess of the lung of unknown etiology. Neuhof³⁰ found gross gingivodental infection in 17 of 26 cases of lung abscess of unknown etiology, and pointed out that among the children in his series where this type of infection was not present there were no cases of unknown etiology. There are other reports³⁹ with the same clinical impression, so that it seems probable that many cases of so-called idiopathic abscess are due to inhalation of infected material from badly diseased teeth and gums.

In many cases it is difficult, if not impossible, to determine whether a sudden illness is due to an abscess proper or to a pneumonic condition with subsequent abscess formation. The roentgenologist may not be sure about the consolidation he first sees, and physical signs, if present at all, are not diagnostic. It is the patchy bronchopneumonia of the influenza type that seems particularly prone to give rise to lung abscess.

Lung abscesses due to the aspiration of foreign bodies usually occur in children, and need no comment here, except to call attention to the interesting observation in a British journal²² that the probable reason why these cases are so much commoner in the United States than in England is the popularity in this country of chewing gum and peanuts.

PATHOLOGY

Single lung abscesses are generally located in the right lung. This is also true, however, of other pulmonary lesions such as embolism and lobar pneumonia. The more direct continuity of the right primary bronchus with the trachea is of interest in this regard. Also the right branch of the pulmonary artery is slightly larger and is said to

come off more directly from the bifurcation, and the right lung itself, of course, is larger than the left.

Most abscesses are situated at the periphery of the lung and the overlying pleura very early shows clouding and thickening. Neuhof²⁰ believes that even in the early acute stage pleural adhesions are present. He describes the lesion as at first an intense necrotizing inflammation of the affected bronchioles with rapid destruction of lung tissue, resulting in cavitation with contained pus and detritus. Others believe that there is first an area of diffuse pneumonitis, which either resolves of itself or undergoes necrosis, liquefaction and cavity formation.^{1, 22, 24} Either of these processes is in contrast to that stimulated by the tubercle bacillus which is essentially fibrosis. If the abscess is recent and progressing, its wall consists of soft, necrotic lung tissue surrounded by edema and hyperemia. The dense rind of the abscess by x-ray, frequently described as fibrosis, melts away so completely under satisfactory treatment that it must be exudative.²²

Single abscesses are usually round and contain thick, yellowish or greenish pus, which may or may not be blood streaked. It may be odorless, sweet or foul, depending on the particular organisms present. If the cavity can be successfully drained, it may be obliterated except for a thin, fibrous scar. On the other hand, if chronic pulmonary suppuration and gangrene ensue, the sputum is apt to become thin, gray or brownish green and intensely foul, and in that event usually reveals fusiform bacilli and spirochetes in large numbers. There is progressive ulceration of lung tissue so that the characteristic lesion is ragged, with an advancing periphery and enlarging cavities filled with necrotic lung, exudate and innumerable bacteria. Patients with these lesions die from absorption of bacterial toxins if they survive any attempted operative procedures and escape such complications as massive hemorrhage, metastatic brain abscess and meningitis. They may drown in their own pus owing to the rapid bronchiogenic spread of the disease.

BACTERIOLOGY

In lung abscess, as in spreading peritonitis following perforation of the bowel, there is usually more than one organism present and the flora may be very complex. The bacteria found in any case depend on whether material is smeared or cultured from the sputum, from pus obtained bronchoscopically or from pus obtained directly from the abscess cavity at operation. Bucher³ cultured pus obtained bronchoscopically from 118 cases and found the following organisms predominant:

| ORGANISM | NO. OF CASES |
|--------------------------------|--------------|
| Streptococci (all varieties) | 93 |
| <i>Micrococcus catarrhalis</i> | 61 |
| Pneumococci | 50 |
| <i>Haemophilus influenzae</i> | 41 |
| <i>Staphylococcus albus</i> | 39 |
| <i>Staphylococcus aureus</i> | 22 |
| Diphtheroids | 29 |
| Spirochetes | 25 |
| Fusiform bacilli | 25 |
| <i>Micrococcus tetragenus</i> | 22 |

He cultured 20 of these anaerobically and found 14 positive for streptococci. Cohen⁴ found anaerobic streptococci in all 16 cases cultured at operation, and in 14 of these he found *Bacillus melanogenicum*. The latter organism has also been widely cultured recently from cases of peritonitis and has been thought² to be the agent responsible for the fetid odor. Neuhof and Wessler²⁴ believe that all putrid abscesses are initiated and certainly maintained by pathogenic anaerobes. They state that they can be found at every stage of the infection and disappear when the infection subsides. Supporting the pathogenicity of these organisms is the work of Cohen,⁴ who found that washed filtrates of 80 per cent of anaerobic gram negative bacilli obtained from lung abscesses at operation gave a positive Shwartzman reaction. Only with organisms giving this reaction was he able to produce severe necrotic lesions in the lungs of rabbits.

There really is no need to postulate a single bacteriologic etiology. We know that many types of organisms give rise to pneumonia, for instance. Possibly the original infecting agent has no clinical significance other than producing the minor lesion in the lung which paves the way for secondary invaders which are in turn responsible for the characters of the full-blown abscess. Possibly it is the quantitative relation between these various secondary organisms that is responsible for differences seen in the clinical picture and course of the disease in various patients. The importance of the synergistic action of various combinations of bacteria we know very little about. From the work of Meleney, Olpp, Harvey and Jero²⁷ and others on the bacteriology of peritonitis it seems probable that synergism often enhances remarkably the pathogenicity of given organisms in the body. The importance of the various types of fungi frequently found is also little understood.

DIAGNOSIS

The clinical picture is so well known that it is necessary here only to recall the typical onset, one to three weeks following operation or pneumonia, of cough, at first dry and then productive of sputum which may or may not be foul and may or may not be blood streaked. There may be dysp-

nea, cyanosis or chest pain of a pleural nature, or these may all be absent. A rise in temperature with general malaise and weakness is a fairly constant finding. Physical examination is seldom of much aid early in the course of the disease. Localized signs in the chest vary according to the size and content of the cavity and the amount of surrounding exudation. Fever, leukocytosis and other constitutional signs of sepsis are present. There may be clubbing of the fingers.

The picture at any one point in the course of the disease depends primarily on the adequacy of drainage, whether by the bronchus or through a surgically created tract. If drainage becomes inadequate the temperature and white-cell count rise, weakness becomes more marked and the patient appears to be losing ground until drainage is re-established.

X-ray examination may show a characteristic single localized abscess cavity with a fluid level, surrounded by a narrow margin of pulmonary infiltration, or the cavity may be filled so that its shadow merges with that of the surrounding exudation in the lung. X-ray examination in the upright position is essential to the demonstration of fluid levels. The abscess may be masked by the simultaneous presence of empyema. While x-ray examination may be important for primary diagnosis, it is of even greater significance in accurate localization of the abscess, which is so necessary for satisfactory postural or surgical drainage. Stereoscopic films and films taken in three planes are invaluable to this end. Sometimes visualization of the bronchial tree by Lipiodol gives the most accurate picture, although it is notably difficult to introduce Lipiodol into an abscess cavity by way of the bronchi. X-ray examination is also of great aid in following the course of the disease, estimating the adequacy of drainage and helping to decide when surgery should be instituted.

Another aid to diagnostic localization is bronchoscopy. When it is skillfully performed, the exact bronchopulmonary segment from which pus is coming can be located in almost every case. Bronchoscopy is all-important where a foreign body or tumor is suspected, and as an aid in evaluating the cause of impaired bronchial drainage.³⁴

TREATMENT

No program of therapy can be outlined which is more than generally applicable, and at present it seems probable that the ultimate result depends less on the choice of method of treatment than on the thoroughness and intelligence with which the method selected is carried out. However, some systematic plan, labile enough to fit the demands and complications of the particular case, should be

adopted. The internist and the surgeon must work together from the beginning, because the rational treatment of lung abscess involves the methods and judgment of both. Every case should have a trial of medical therapy before surgery is instituted, but the surgeon should follow the case with the internist during this period.

Of 2114 cases collected from the literature by Allen and Blackman,¹ 51 per cent were treated conservatively and 49 per cent came to some type of surgical procedure. The mortalities in these two groups are almost identical, 34.4 and 34.2 per cent. The difference in the type of the cases in the groups should be remembered. It is doubtful whether any lung abscess heals without the establishment of good drainage. This may be accomplished, however, by spontaneous rupture into a large bronchus as well as by various medical and surgical procedures. This appears to be particularly true in children. One third of the cases diagnosed as lung abscess on the basis of cavitation by x-ray at the Children's Hospital cleared with only conservative therapy in two or three months, and most of these were symptom-free after six weeks' observation. This high percentage suggests that there are many more cases of mild lung abscess which clear up spontaneously at home and never get diagnosed. Graham, Singer and Ballou¹⁸ hold the same view as to adults, believing that almost every patient with streptococcal pneumonia has some small abscesses. In adult series probably 1 case in 5 heals spontaneously. Expectation for this type of recovery is largely confined to patients with a short previous duration of the disease. The exciting cause of the abscess appears to be of no significance.

What is the proper medical treatment of lung abscess? Besides complete bed rest, a high-vitamin, high-caloric diet, adequate fluids and pleasant surroundings, the importance of all of which cannot be overestimated, medical measures include postural drainage, bronchoscopic drainage, pneumothorax, the giving of arsenic and guaiacol and symptomatic drug therapy. The regimen should be as strict as that of pulmonary tuberculosis, and cases which respond should receive hospital or sanatorium care for considerable periods after they have become symptom-free. This step is only too often neglected, with a discouraging recurrence of the lesion.

Postural drainage is the most important single procedure. In order to be of value, it must be carefully and faithfully carried out. The exact location of the abscess must be determined, so that the best position for drainage can be assured. "Posturing" is usually advocated for fifteen or twenty minutes three or four times a day. It is

not infrequent to obtain 300 or 400 cc. of pus per day by this method. Continuous postural drainage is too uncomfortable. It must be remembered that it is frequently a great physical effort to get the pus out, and what the patient may need most of all is rest.

The place of the bronchoscope in the treatment of lung abscess is not yet definitely established. It is of the greatest value where a foreign body or bronchostenosis due to some other cause is present. Obstruction due to inspissated secretion can readily be relieved. In cases of inoperable bronchiogenic carcinoma with associated abscess it is justifiable to employ bronchoscopic drainage of the abscess because of the distressing symptomatology. The instrument may be passed as often as two or three times a week without undue inflammatory reaction of the bronchial mucosa.⁴⁴

Pneumothorax has been practically discarded in the treatment of abscess because of the danger of producing empyema, and because it has generally been disappointing as a means of closing cavities. It is not nearly so effective in this respect as it is in tuberculosis, and more than 50 per cent of cases require further surgery.⁴⁵ It is indicated only in cases where the cavity is adequately drained centrally by a bronchus, yet does not collapse satisfactorily. If compression therapy is attempted when adequate drainage has not been established, the patient may rapidly drown in his own pus. Also it must be remembered that the cough is the body's most efficient means of expelling undesirable material from the upper respiratory tract, and anything which interferes with intrathoracic compression, and therefore with coughing, handicaps drainage.⁴⁶

Arsphenamine and related compounds appear to be of value only in cases in which there is a copious growth of spirochetes, and even here the results are not very striking. It seems probable that small intravenous doses of neosarsphenamine regularly repeated may prevent the loss of lung tissue due to secondary spirochetal invasion, but is doubtful if it has any effect in healing the abscess itself.^{47 48 49}

Nammack and Tiber⁵⁰ have reported the cure of 16 of 20 selected cases treated intravenously with guaiacol, Guaiacol, creosote and related compounds have long been known to be of some value in the treatment of the secondary invaders in pulmonary tuberculosis. When this material is injected intravenously with sodium iodide in a dilute alcoholic solution, it is recovered in the sputum or in the drainage from the operative wound during the first forty-eight to seventy-two hours. The patients in this series are reported to have felt better a short time after the administration of the

drug was started, owing to subsidence of fever and cough and decrease in the daily output of foul sputum.

What are the indications for surgical intervention and what does the surgeon have to offer? In reporting cases from the Peter Bent Brigham Hospital, Cutler and Gross⁵¹ state that the mortality could probably be lowered if all cases were submitted to early surgical drainage, but that many patients would then be operated on who would have recovered spontaneously. General opinion has held that six weeks to two months of active medical therapy should be tried, and this treatment prolonged if significant improvement occurs. Neuhoof,^{52 53} in New York City, holds a more radical view, believing that abscesses should be operated on in the acute stage, that is in less than six weeks, if they are not progressing satisfactorily. He reports losing only 4 out of 45 consecutive cases operated on in the acute stage.

The surgeon has at his disposal various compression operations, one-stage or two-stage external drainage and lobectomy and pneumonectomy. Phrenicectomy, extrapleural pneumolysis and thoracoplasty have all been used, but like artificial pneumothorax have been unsatisfactory and generally abandoned because of the danger of empyema and of a drowned lung resulting from collapse in the absence of adequate central drainage. These operations may be indicated in deeply situated abscesses communicating with a large bronchus, draining well and unlikely to rupture into the pleural cavity. However, such an abscess must be extremely rare, and is likely to heal spontaneously if central drainage is maintained.

Rib resection with external drainage is indicated when the abscess is at the periphery of the lung. Here the abscess drains poorly into the bronchi and is likely to rupture into the pleural cavity. There is little normal lung over the abscess, so that the danger of pneumonia and hemorrhage from operation is minimal. A one-stage operation is indicated when there are well formed overlying pleural adhesions. Neuhoof⁵⁴ believes that with any peripheral abscess agglutinating adhesions of the two pleural surfaces occur very early usually within two weeks, and that the important thing then is to find them. He claims to have found overlying adhesions in every one of his cases no matter how early he operated though not always where he first looked for them. Most surgeons, however, have thought that during the early stages of the disease, while adhesions may be present, they do not entirely obliterate the pleural cavity, so that a one-stage procedure is not suitable. When adequate adhesions are not present a two-stage operation is in

licated, the first stage of which is done in order to create such adhesions by sewing the pleural layers together, packing gauze against the pleura or by some other means. The second stage, then, usually performed by cautery excision, consists in unroofing the abscess cavity and packing it thoroughly. Bronchial fistulas are always seen at operation, and in the subsequent treatment should be allowed to close only after all evidence of anaerobic infection is gone and infiltration is no longer present as shown by x-ray, a matter usually of at least six to eight weeks, and often some months.

A ruptured abscess with pyopneumothorax demands immediate drainage, and the prognosis in that event is usually graver than otherwise. Diagnostic or therapeutic needling of the lung abscess should be avoided because of the possibility of contamination of nonadherent pleural surfaces.

Lobectomy and total pneumonectomy are the newest weapons of the thoracic surgeon. These radical procedures are not well suited to acute suppurative lesions, because the presence of active infection makes bronchopleural fistula, empyema and other complications common. In carefully selected cases, however, one of these methods can be used, and indications for this type of surgery are being rapidly extended.

It is not possible at present to tell which cases of lung abscess are proceeding on to chronic pulmonary suppuration and gangrene.²⁵ The cases at the Children's Hospital were examined with this in mind, but aside from the time factor nothing significant was apparent. If healing by conservative means is going to occur at all, it seems to do so in the first six weeks. Abscesses which fail to resolve within this time probably will never do so, and the early use of radical surgery may then be indicated. Any correlation between the bacteriology of the sputum first obtained and the future course of the disease was not discernible because of insufficient bacteriological data. It was impossible in the postoperative cases to find out what sort of condition the child was in at the time of the operation, since it was performed in another hospital or at home. Postoperative lung abscesses are rarely treated in the same clinic in which the original operation was performed.

The etiology of the abscess in these cases apparently had no effect on the ultimate outcome. About one third of them resolved spontaneously, one third were improved or cured by surgical procedures and one third resulted in death, either from acute overwhelming sepsis or from chronic suppuration which did not respond to surgery.

PREVENTION

Can anything be done to lower the incidence of lung abscess? The measures of recognized importance in the prevention of all postoperative pulmonary complications should be rigidly observed. These are, essentially, reduction of trauma to a minimum, careful hemostasis, careful control of sepsis and, most important of all, extreme caution in operating on patients with any predisposition to atelectasis or formation of mucus.¹⁰ To these we might add certain measures of probable significance in lessening the aspiration of infected material. Oral and dental hygiene should receive exact evaluation, and gingivodental infections be treated before any elective surgery is undertaken. Tonsillectomy and other operations on the upper respiratory tract must be considered as major surgical procedures and should be performed in a hospital. This is especially true in adults, where tonsillectomy should be performed only with definite indications. Teeth should be extracted in several sessions and where possible under local anesthesia. Interference with lung ventilation during and after operation should be closely watched for, and atelectasis resulting from mucous plugs relieved immediately by aspiration. A self-evident prophylactic measure is the adequate early treatment of pneumonia and other severe upper respiratory infections.

SUMMARY AND CONCLUSIONS

The majority of cases of nontuberculous abscess of the lung follow operative procedures of the upper respiratory tract or develop subsequent to unresolved pneumonia or other severe upper respiratory infections.

A primary lesion in the lung is apparently present before secondary infection with mouth organisms takes place, this may be infarction as a result of embolism or atelectasis as a result of bronchostenosis or bronchiolar obstruction.

There is no single bacteriologic etiology. The flora of the full-blown abscess is usually complex, and the quantitative importance and possible synergism of the various organisms are not at present understood.

It appears that oral infection is disproportionately common in adult patients with lung abscess of unknown etiology. This type of abscess is rare in infants and children.

The diagnosis of lung abscess is usually readily made from the history and general clinical picture, aided by roentgenography and bronchoscopy. The physical findings in the chest may be variable and inconclusive.

Accurate diagnostic localization is the most im-

portant prerequisite to both medical and surgical treatment

Twenty to 30 per cent of cases heal with only supportive treatment, and all cases should receive an adequate trial of medical therapy, of which the most important feature is supervised postural drainage.

Collapse therapy, either by pneumothorax or by more extensive operative procedures, should never be attempted unless the abscess cavity has been adequately drained

In peripheral abscess with reaction of the overlying pleura external drainage done earlier than heretofore generally practiced, and based on accurate localization of the lesion, would seem to be indicated

In abscesses which fail to respond to active medical therapy in two or three months, especially in children whose general condition is good such radical surgery as lobectomy deserves early serious consideration, in order to avoid progression to chronic pulmonary suppuration and gangrene

The prophylaxis of lung abscess includes careful operative technic caution in operating on patients with any predisposition to atelectasis, close observation of lung ventilation during and after operation, conservative surgery on the upper respiratory tract with the use, if possible, of local anesthesia, improved oral hygiene and adequate therapy of respiratory infection in the early stages

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REPORT ON MEDICAL PROGRESS

THE LEUKEMIAS*

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LEUKEMIA may be defined as an acute or chronic systemic disease involving primarily the blood-forming organs, characterized by a widespread, disorderly and profitless proliferation of the leukocytes and their precursors, manifest by the presence, often in very large numbers, of immature or abnormal white cells in the peripheral blood stream, and leading, at least in the vast majority of cases, to death within a comparatively short time

CLASSIFICATION

From a clinical viewpoint, there is a rather sharp distinction between acute and chronic leukemia, and some authorities believe that there may be a fundamental difference in their essential nature and etiology. It is usual to classify the leukemias according to the particular type of white cell involved. We have, therefore, myelogenous, lymphatic and monocytic leukemia. The latter^{1, 2} is almost always acute, and in the opinion of some investigators constitutes the majority of the cases of acute leukemia in adults. In addition, there have been described eosinophilic³ and plasma-cell⁴ leukemia. For most practical purposes it is probably sufficient to disregard the latter two forms, which at best are extremely rare, and to group all types of acute leukemia together as one clinical entity. It is advantageous, however, to retain a sharp distinction between chronic lymphatic and chronic myelogenous leukemia.

GENERAL OBSERVATIONS

Fortunately, leukemia is a rare disease. It is difficult to estimate its frequency with any degree of accuracy. In 8693 autopsies at the Boston City Hospital from 1920 to 1939 the condition in one form or another was encountered 78 times. During the same period a clinical diagnosis was made 333 times among 324,785 admissions to the medical and surgical wards. These figures closely approximate those of Ordway and Gorham,⁵ who estimate that 1 case of leukemia occurs in every

1000 general hospital admissions. It must be remembered, however, that not a few patients with leukemia are nowadays referred by their physicians directly to hospitals whose staffs are particularly interested in the condition and which are especially equipped to treat the disease. Such cases are, therefore, not frequently seen on the wards of a general hospital.

All types of leukemia are much commoner in men than in women. This is especially true of chronic lymphatic leukemia.⁶

Acute leukemia is commonest in the early decades, a major peak being reached in the first five years of life, and a secondary though still significant rise occurring early in the second decade. While the disease may be seen at any time of life, it is distinctly rare after the age of fifty.

Chronic myelogenous leukemia is most commonly encountered between the ages of twenty and sixty, and reaches its greatest incidence between the ages of twenty-five and thirty-five, whereas chronic lymphatic leukemia is most often seen in persons between forty-five and sixty years of age. Any form of chronic leukemia is rare under the age of ten.

The etiology of leukemia is unknown, though it is probable that the chronic forms are closely related to the true neoplastic diseases, and some competent observers believe that the acute forms, while perhaps also of malignant nature, are more intimately related to infection.⁷ Furth and his associates,⁸ on the basis of extensive studies of experimental leukemia in mice, have concluded that all types of leukemia are true neoplastic diseases.

There are certain changes in the bodily economy common to all types of leukemia, and these should be referred to briefly. In all, the basal metabolic rate may be considerably increased⁹ thus giving rise to certain signs and symptoms such as tachycardia, increased sweating, loss of weight, nervousness and easy fatigability, all reminiscent of hyperthyroidism. The basal metabolic rate may thus be of some value in the differential diagnosis of leukemia and the leukemoid states, and may further be of value in determining the need for therapy and the results thereof. The nitrogen balance varies within wide limits, but

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particularly in acute leukemia it is liable to be negative and the serum proteins tend to be low. These facts should be borne in mind when considering the therapy of the disease, the diet should at all times contain an adequate amount of protein for the individual needs, and it should be remembered that often large amounts of protein and nucleoprotein are lost to the body each day.

Anemia of the normocytic and normochromic type is an almost invariable accompaniment of the disease sooner or later. This anemia is chiefly a myelophthisic one, due to the overcrowding of the marrow by the exuberant growth of leukocytes, but in certain cases it may be greatly enhanced by hemorrhage, particularly into the gastrointestinal tract. The presence or absence of anemia is of great diagnostic value in the acute forms, and in both acute and chronic leukemia progressive anemia may bring about symptoms of major importance and call for specific and energetic therapy. The presence of severe anemia usually indicates an early fatal outcome, especially in the acute and the chronic lymphatic types.⁴

Any form of leukemia, but more especially the acute, may be accompanied by spontaneous hemorrhages of minor or major clinical importance. In the acute forms, this hemorrhagic state is dependent to a great extent on the frequent paucity of blood platelets, in the chronic leukemias the same may be true, but there is the added factor, not manifest in the peripheral blood stream, of direct damage to the finer blood vessels by the invading leukocytes.

It is of the utmost importance to recognize the fact that any organ or structure of the body may be involved by the leukemic process, for thus are the extremely protean signs and symptoms of the disease brought about. It is perhaps germane to the present purpose to draw attention to lesions of five systems in particular, for lack of recognition of the fact that these systems are frequently involved may lead to failure to recognize the fundamental systemic disorder, or failure to treat as leukemic manifestations symptoms or signs easily attributable to other causes.

In the mouth and pharynx, there may be ulcerations, necrosis, bleeding and even noma, especially in the acute forms of the disease. Monocytic leukemia in particular is associated with severe oral lesions.² It is not unusual to find in acute leukemia that the first symptom is unexpected bleeding following a minor operation such as a simple tooth extraction. More than one patient with leukemia has first consulted his dentist for a supposedly local sign or symptom, and I know of one oral surgeon who very wisely al-

ways does a complete blood examination in any puzzling or peculiar "mouth case." It should further be borne in mind that in elderly people a sore throat of unusually long duration or enlargement of the tonsils without obvious infection may be due to lymphatic leukemia.

The eye is involved sooner or later in over half the cases of leukemia,¹⁰ though obvious clinical manifestations may not be present. Retinitis, retinal hemorrhages, edema of the disks and marked engorgement of the vessels are the commonest changes noted. Diminution of visual acuity is not rare, and sudden blindness may be the first symptom noted. Exophthalmos, either unilateral or bilateral, may occur, especially in children.

The central nervous system is similarly often involved,¹¹ lesions of the cranial nerves, reflex changes and hemorrhages, large or small, being the most commonly seen. In rare cases, meningitis is simulated and in the sterile spinal fluid are seen the immature cells characteristic of the individual type of leukemia at hand.

In the skin a bewildering variety of lesions occurs.¹² Indeed in certain cases the chief, if not the only clinical manifestation is a dermatologic one. There may be single or multiple nodules, often of a quite nonspecific character. Or there may be, particularly in chronic lymphatic leukemia, a diffuse reddening and scaling of the skin accompanied by intense itching. As in the non-leukemic lymphomas, herpes zoster is not uncommon, and in rare cases it may be of universal distribution.

Changes in the bones or symptoms related thereto are common and important, particularly in the acute leukemia of children, in whom rheumatic fever may be closely simulated.^{13, 14} The fact that children with leukemia often present a peripheral blood picture which is atypical makes this fact particularly significant, for the joint symptoms may so dominate the clinical picture that the true diagnosis is completely overlooked.¹⁵ Periosteal infiltrations and a moth-eaten mottling of the ends of the long bones as shown in the roentgenogram are particularly suggestive of a leukemic process.

It is thus obvious that the clinical manifestations of leukemia are most varied and that the presenting signs and symptoms may not necessarily suggest the widespread nature of this uniformly fatal disease, which may at first manifest itself as a comparatively isolated lesion of a system which is only remotely connected with the blood-forming organs, and which not infrequently falls within the province of the specialist rather than that of the general internist.

As has been said above, for most practical pur-

poses all types of acute leukemia, whether lymphocytic, monocytic or myelogenous may be regarded as one and the same disease. This is so because the prognosis and treatment in all are essentially the same. For those particularly interested in the more exact and definitive classification of the acute leukemias, we refer to the studies of Forkner.

ACUTE LEUKEMIA

The onset of acute leukemia is usually insidious, more rarely abrupt. It should be constantly borne in mind that the disease is essentially one of infancy and childhood, though no age is spared. Often an ill defined and gradually increasing weakness or an unexplained torpor and lassitude constitute the presenting symptoms. Equally common, and equally deceiving to the unwary, are symptoms of sore throat, ulcerations of the buccal mucosa or hemorrhages following some minor surgical procedure. Only too often, the localized nature of the symptoms overshadows the systemic nature of the disease. Peirce¹⁰ has drawn attention to the fact that in many cases the first symptoms seem to be related to upper respiratory infection from which the child does not recover as it would seem he should. A gradually increasing pallor may be the sole sign apparent. Nausea, vomiting, abdominal pain, melena and anorexia are not infrequent. Occasionally these may be of such character as to suggest an acute abdominal emergency, and patients have been operated on for supposed appendicitis or acute intestinal obstruction.¹¹ Fever, often of a septic type, is usually present, and may be seen even when the patient appears to be in good general condition.

Early in the course of acute leukemia the physical examination may be essentially normal. Sooner or later, however, there is usually generalized enlargement of the lymph nodes and the spleen is commonly palpable on deep inspiration. Hemorrhages into the skin, mucous membranes and eye grounds are common. The frequent oral lesions have already been discussed. Occasionally—and these cases may be most deceptive—acute leukemia in children masquerades as rheumatic fever.¹² It is most important to remember that under a variety of signs and symptoms—many of them apparently of minor importance—may lurk one of the most dreaded of all children's diseases.

The peripheral blood in the majority of cases shows a characteristic picture. The white-cell count may be normal, moderately elevated or markedly depressed. Leukopenia is particularly prone to be found in the early stages of the disease. Only rarely does one encounter the great increase in white-cell count so frequently seen in the chronic

leukemias, and it cannot be emphasized too often that the total white-cell count per se has little or nothing to do with the diagnosis.

In the classic case, there is a preponderance of very immature white cells of one or another series. Often stem cells, characterized by their deep blue cytoplasm and their prominent nucleoli within the nucleus, predominate in the blood smear. If 90 per cent of the white cells—no matter what the total count and no matter what the symptoms—are true stem cells the diagnosis is almost certainly acute leukemia. But an occasional stem cell may be found, especially in children, in a large variety of conditions, and one must always be cautious before making a final diagnosis. Relatively mature white cells of any series may compose the majority of the white cells in the blood smear, and rarely there are but few very young white cells present. Under the latter circumstances it is most difficult to diagnose acute leukemia with any assurance. Occasionally one finds the so-called hematologic hiatus, in which there are present in considerable numbers both extremely immature and quite mature white blood cells. No intermediate forms are present. Under these circumstances a diagnosis of acute leukemia is almost certain.

The platelets in acute leukemia are almost invariably greatly reduced in number, and this fact is of the highest importance in differentiating this disease and certain cases of overwhelming infection in which as a rule the platelets are increased in number, often markedly so.

Sooner or later in acute leukemia a moderate or severe anemia develops. It must be remembered, however, that the life of the red cell in the peripheral blood is such that anemia arising primarily from bone-marrow failure does not take place for a matter of weeks, so that the absence of anemia in the presence of other unequivocal signs and symptoms of leukemia should not be construed as evidence against such a diagnosis if the case be seen early.

Thus progressive anemia, a preponderance of very immature white cells in the blood smear and thrombocytopenia usually indicate the presence of acute leukemia. If there be in addition splenomegaly and slight generalized lymphadenopathy, the diagnosis becomes practically certain. It is important to remember, however, how protean may be the clinical manifestations of the disease and how variable the blood picture.

Acute leukemia must be differentiated chiefly from infectious mononucleosis, aplastic anemia, agranulocytic angina and overwhelming sepsis.

Infectious mononucleosis may usually be distinguished by the presence of the characteristic white

cells of this disease,^{17 18} by the absence of anemia and thrombocytopenia and by the presence of a positive sheep-cell agglutination test.¹⁷ This test is never positive in leukemia, and if positive in dilutions of 1/64 or greater is clear evidence that one is dealing with infectious mononucleosis, unless there has been a recent administration of horse serum.

In aplastic anemia there are few if any really immature white blood cells in the peripheral smear and classically all three essential formed elements of the blood are concomitantly diminished. The basal metabolic rate is not increased, and there is rarely splenomegaly and never generalized lymphadenopathy of any moment. Yet in certain cases it may be impossible without bone marrow biopsy to be confident of the diagnosis.

Cases of acute leukemia have often been erroneously diagnosed as agranulocytic angina.¹⁹ In view of the different prognosis and treatment of the two conditions, it is of the utmost importance to differentiate them clearly. In general it may be said that in agranulocytic angina anemia and thrombocytopenia are absent, that extreme leukopenia is the rule and that one rarely sees immature white blood cells in any number during the acute stage of the disease. During recovery however the white-cell count may occasionally rise to 20,000 or even 100,000 and there may be many myelocytes and even younger white cells in the blood. Under these circumstances it may be difficult to say whether one is dealing with a marrow overactive following a period of pathologic inactivity or with leukemia. Agranulocytic angina is very rare in children but to make matters more difficult what appears to be the true disease has been followed after weeks or months of remission by true acute leukemia. The majority of these cases have been those of children or very young adults, so that one should always be most cautious in regard to prognosis of the leukopenic state in this age group.

Overwhelming sepsis may manifest itself by anemia and by the presence in the blood of extremely immature white cells often in considerable number. Usually however the platelets are increased rather than decreased in number and in the majority of cases, the infection has obviously preceded the development of the abnormal blood picture so that the differential diagnosis is clear. But when one remembers that sepsis is a common complication of acute leukemia one realizes the difficulty of making an accurate diagnosis in any given case. When in doubt it is probably wise to treat the case as one of infection and give a guarded prognosis.

The course of acute leukemia is almost invariably progressive onward to death within a few weeks or months. Very rarely there may be remissions of considerable duration, during which the patient returns to apparent health and the blood picture is normal.⁶ The physician must be careful not to allow such temporary improvement to lull him into a false sense of security.

There is no form of treatment known that affects the course of acute leukemia. X-ray therapy is seldom of even temporary advantage, and it may cause severe reactions. If the diagnosis of acute leukemia is clear radiation is probably contraindicated. If there is an anemia causing untoward symptoms, transfusions of blood may be given but severe reactions are liable to take place even with correctly matched bloods. One of the most difficult tasks which confront the physician is that of withholding any treatment other than symptomatic in these cases. Yet such is usually the wisest course and the best that one may hope for is that the end will come quickly or that one's diagnosis is incorrect.

CHRONIC MYELOGENOUS LEUKEMIA

The onset of this disease is usually insidious, and the condition has most often been in progress for many months by the time the patient seeks medical advice. The commonest symptoms are loss of weight and strength, increased sweating, weakness and distention of the abdomen. Often there is generalized abdominal discomfort especially after meals owing to the presence of a greatly enlarged spleen which encroaches on and interferes with the gastrointestinal tract. More rarely there may be acute pain in the splenic region attendant upon the very common splenic infarcts. Pallor, dyspnea, nausea and anorexia are common. Occasionally there may be a marked hemorrhagic tendency. Eye symptoms are not unusual and may be due to retinal exudate, hemorrhages or edema of the disks.

When the patient is first seen the spleen is usually enlarged, often greatly so, but early in the disease, splenomegaly may not be a prominent feature and its absence does not exclude a diagnosis of leukemia. Moderate hepatomegaly is usually present. Generalized lymphadenopathy is rare but occasionally enlarged lymph nodes are found in the neck, axilla and elsewhere.

The total white count is classically elevated—often to a very great degree. White counts of 200,000 to 500,000 are not unusual and counts well over a million have been reported. It must however be constantly borne in mind that the total white count per se is not the most important fac-

tor in the diagnosis. One may find white counts of 150,000 and over in patients who do not have leukemia and patients with leukemia may show a marked lowering of the total white count. The important feature, in so far as the blood is concerned, is the increased percentage of very immature cells. In the average case, myelocytes in various stages of development comprise the majority of the cells, varying from 10 to 80 per cent. Stem cells are seen in the more rapidly advancing types, but very rarely to the degree seen in acute leukemia. It is important to bear in mind that marked fluctuations in the total white-blood-cell count and in the differential may occur without any treatment whatever and that these variations are of little or no prognostic value.

Sooner or later a normocytic, normochromic anemia develops and the red cells often show a polychromatophilia and a considerable number of nucleated red cells. The platelets may be normal, increased or decreased in number. A marked decrease is of grave prognostic import.

The usual case with splenomegaly, greatly increased white-cell count and immature granulocytes can be diagnosed with some assurance, but it is important to recognize that a wide variety of conditions may give rise to a leukemoid blood picture.¹⁵⁻²¹ Space does not permit an analysis of the differential points involved, but it should be mentioned that blood pictures simulating myelogenous leukemia may be seen in sepsis, metastatic carcinoma, miliary tuberculosis, sulfanilamide poisoning, polycythemia vera and especially in agnogenic myeloid metaplasia.²² In this last condition, which may very closely simulate myelogenous leukemia, particularly in the aleukemic phase, x-ray treatment should be given with the greatest caution if at all, for the chief seat of blood formation in these cases is the spleen. It is obvious that if by radiation one destroys even in part the sole or major source of blood formation, one may do more harm than good.²²⁻²³

The disease is usually steadily progressive and leads to death in two to four years. Some 10 per cent of patients survive ten years or more from onset. In the majority of cases the course of the condition is such that the experienced physician can foretell with some accuracy when a fatal termination is near, but it should be pointed out that sudden and unexpected death (usually from cerebral or gastrointestinal hemorrhage) occasionally occurs, and the family should be apprised of this fact.¹⁵

To date, the most effective treatment is irradiation of the spleen. It is best to leave the exact amount of irradiation given to the radiologist in

charge, but certain generalities may properly be pointed out. As a rule, one gives to the spleen approximately 600 r at 250 kilovolts in divided doses over a period of a week to ten days, watching the white-cell and differential counts carefully during the treatment. The white-cell count should not be allowed to fall below 15,000 or 20,000 (when it has previously been greatly elevated). If the initial counts are already relatively low, x-ray treatment should be undertaken with caution. The beneficial results in so far as the patient's general sense of well-being is concerned often do not take place for a matter of several weeks, and this fact should be drawn to the patient's attention before therapy is instituted. If the initial red-cell count is below 3,500,000, one or more blood transfusions are indicated before irradiation therapy is undertaken. If the platelets are few, x-ray therapy should be undertaken with caution. It should be pointed out, however, that appropriate radiation therapy in cases of myelogenous leukemia not infrequently results in an increase of platelets when these elements have previously been few in number.

Further treatment, after the first course, may be withheld until such time as the patient's symptoms appear to call for alleviation. It is well to remember that it is problematical whether life is prolonged by irradiation, and that our efforts should be aimed chiefly at the alleviation of symptoms rather than the mere reduction in the total white-cell count.

If x-ray therapy is not available, — and at present it is available only in the large centers, — one may advantageously use Fowler's solution by mouth. For the details of such treatment, the reader is referred to the article by Forkner.² In general, it may be said that from 5 to 40 minims of Fowler's solution are given three times a day until the desired lowering of the white-cell count has taken place, and the patient is then continued, with rest periods, on a small maintenance dose. It is important to recognize, however, that treatment by arsenic must be carefully suited to the individual case, and in all instances the dosage must be very gradually stepped up from the minimum to the optimum. Unfortunately, while it is true that marked improvement in the blood picture can usually be brought about by this form of treatment, the fact remains that toxic manifestations such as anorexia, skin lesions, diarrhea and peripheral neuritis are not uncommon, and they may render the patient even more uncomfortable and ill than does the fundamental disease, so that x-ray therapy remains the treatment of choice.

In our enthusiasm for x ray therapy and our satisfaction with the results obtained, we should not lose sight of the advisability and indeed the necessity of general supportive measures. Adequate diet, plentiful in vitamins and proteins, should be maintained. Proper rest periods during the day may enable a patient to carry on his activities with reasonable success. Iron in the form of ferrous sulfate is frequently helpful. Transfusions of blood—often repeated many times—are of great advantage if there be a marked anemia.

CHRONIC LYMPHATIC LEUKEMIA

There is a close relation between lymphatic leukemia and lymphosarcoma. The latter condition may be widespread and reach massive proportions without there being any manifestations of the condition in the peripheral blood, but not infrequently a patient with an isolated lymphosarcoma will, with the passage of time, develop the peripheral blood picture of classic lymphatic leukemia, and conversely there may arise in patients with lymphatic leukemia large tumor masses in the mediastinum or elsewhere. For most practical purposes these two conditions may be regarded as identical.

Chronic lymphatic leukemia occurs in an older age group than does chronic myelogenous leukemia and is less amenable to treatment but is more likely to run a long and relatively benign course.

Not infrequently the disease is for a long time symptomless. Each year in any large general hospital cases with the disease but with no symptoms attributable to it, are discovered on the medical or surgical wards solely through routine blood examinations. The commonest symptoms are weakness, pallor, general malaise, vague gastrointestinal symptoms, general enlargement of lymph nodes and a hemorrhagic tendency. In certain cases a diffuse reddening and itching of the skin is the presenting and indeed the only symptom. Both melena and hematuria are seen with sufficient frequency to merit particular attention.

On physical examination one may find nothing of note. More usually, however, there is a widespread lymphadenopathy, the lymph nodes themselves being of a fairly uniform size and distribution and of the consistence of soft rubber. The spleen is usually enlarged, though only rarely does it reach the massive size attained in chronic myelogenous leukemia.

The white count may be normal, subnormal or—most commonly—greatly elevated. White cell counts of over 500,000 are not unusual. The differential count shows an overwhelming pre-

ponderance of lymphocytes, the majority of which appear normal. In the more rapidly advancing cases it is usual to find a certain percentage of young lymphocytes, though their presence even in considerable quantities does not invariably indicate an early fatal outcome, as is witnessed by the fact that one patient—a sixty-five-year-old man—has had some 20 per cent of lymphoblasts in the peripheral blood stream for a period of six years but is still able to carry on an active and strenuous career. Anemia is an almost invariable accompaniment sooner or later. The platelets may be increased in number, but more commonly they are sharply decreased, and their paucity in this disease does not carry the same unfavorable prognosis that the similar finding in chronic myelogenous leukemia does.

In the typical case the diagnosis can hardly be missed, but when there is an associated leukopenia it may be almost impossible to make, and on occasion the disease must be distinguished from pertussis, infectious mononucleosis, aplastic anemia and rarely atypical tuberculosis.

On the average, patients with chronic lymphatic leukemia survive only three or four years from onset of the disease, but fully 10 per cent live ten years or more, and rarely the patient may survive an even longer time, and even then succumb to some other quite unrelated condition.¹⁴ This fact should be borne in mind, particularly in elderly people with few or no symptoms referable to the leukemic picture.

As with chronic myelogenous leukemia, irradiation of the spleen or chest, preceded by blood transfusions if there is a co-existing anemia of moment, is the treatment of choice. It is very questionable, however, whether there is any advantage in treating those patients who are symptomless. The details of the x ray therapy should be left to the radiologist in charge, but the same general principles hold as with chronic myelogenous leukemia.

In certain cases, Navitol in large doses—50 or 75 drops a day—seems to be advantageous, particularly in alleviating itching in those patients who have generalized skin lesions. If tumor masses of lymphosarcoma arise and cause symptoms, irradiation should be given directly to them.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTHEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26011

PRESENTATION OF CASE

A seventy four year-old Swedish widow was admitted to the hospital complaining of pain in the lateral side of the right knee of three and a half to four months duration.

The patient was well until four months before admission when all but four of her teeth were removed because of "pyorrhea." The extractions were performed without known complication. About three and a half months before entry, without known trauma, she first felt a slight transient stabbing non-radiating non-throbbing pain in the lateral side of the right knee. The pain increased rapidly in severity and in duration so that about two months before admission she was forced to stop her daily housework. She went to bed for two weeks and applied liniments locally but without improvement. She was able to work again for a few weeks, but was forced to stop when the pain on motion of the joint became so severe that at times she felt faint. However, there was no discomfort when the leg was at rest. The knee had been slightly swollen since the onset of her illness, but it increased rapidly in size during the three weeks before admission. She had been unable to walk for two weeks because of pain. She lost about 5 pounds in weight (normal weight 160 pounds) during the present illness.

Physical examination revealed a fairly well developed and nourished woman in no apparent acute distress. The examination was negative except for that of the right leg which showed a painful, swollen, questionably fluctuant hot area located above and lateral to the knee. The overlying tissues were tense and relatively immobile.

The temperature was 99°F., the pulse 110 and the respirations 20.

Examination of the blood showed a red-cell count of 4,200,000 with 70 per cent hemoglobin (Tallqvist) and a white-cell count of 15,800 with 83 per cent polymorphonuclears. The corrected sedimentation rate was 1.2 mm a minute. The urine was negative, there was no Bence Jones protein. The blood Hinton test was negative. The serum calcium was 10.2 mg per 100 cc., the

phosphorus 4.3 mg, and the serum phosphatase 57 units. X-ray examination showed a localized area of bone destruction in the lower end of the right femur, it began at the anterior joint margin and extended upward 4.5 cm. The lesion was about 3 cm in depth and ulcerated, with a 3-cm soft-tissue mass. There was slight periosteal proliferation more marked on the medial aspect of the femur slightly away from the area of destruction, this reaction simulated "collar formation." There was also some new-bone formation at the margins of the lesion, seen best in the antero-posterior view. The soft tissues were only slightly thickened. There was no fluid in the joint. The patella was elevated and slightly below its normal position. The left knee and other bones were normal. The chest was negative. An intravenous pyelogram was negative. A barium enema was negative.

On the fifteenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR THOMAS J. ANGLEM: The important fact in this case is that we have a destructive lesion in the lower end of the femur in a woman aged seventy four who gave a story of pain referred to the lateral aspect of the knee for three and a half to four months, gradually increasing in severity and associated with progressive swelling referred to that part. I think we should save considerable speculation and exploration of blind alleys by viewing the x-ray films.

DR AUBREY O. HAMPTON: I cannot add anything to the description in the record. I can point out the things that were described. The lesion is here, it is almost a purely destructive process, which extends down to and underneath the cartilage of the knee. It does not destroy the cartilage but is exactly against it and forms an area of destruction somewhat similar to that of a giant cell tumor. The remainder of the findings are not the least bit similar to those of a giant-cell tumor. The "collar formation" here is quite definite. We thought we could rule out an infectious process because there was no fluid in the joint.

DR ANGLEM: The first problem is, as Dr Hampton has already said, to rule out an infectious process. I think we might well attack the differential diagnosis by eliminating one possibility after another. The first paragraph provides material for a tempting hypothesis. The patient was said to have had extraction of all but four of her teeth for pyorrhea, and it is not unreasonable to assume that she may have had apical dental infection. The trauma incidental to dental ex-

mine the exact nature of the tumor. The entire knee joint was full of this material. We were much impressed with the lining of the cavity, it was not the smooth lining that you see in benign giant-cell tumor, and the depth of the cavity was much greater than that indicated by the x-ray film. For that reason we did not accept the diagnosis of giant-cell tumor and continued with the amputation.

CASE 26012

PRESENTATION OF CASE

A twenty-five-year-old Negro, born on Cape Verde Islands, was admitted to the hospital complaining of pain in the left upper arm.

Six years before admission the patient noticed a moderately severe, non-radiating, aching pain in the middle of his left upper arm. The pain responded favorably to "liniment" and massage, and he was asymptomatic after two or three days. Since then he had suffered similar yearly recurrences, without swelling, local heat, radiation of pain, chills or fever. Between attacks he felt well and was able to work as a picker in a Cape Cod cranberry bog. Six months before entry, however, the pain became much more severe and involved the left elbow, and he was unable to use the arm for two to three weeks. Since then he had experienced almost monthly attacks of pain in either the elbow or middle arm, and for two months before entry, the discomfort had been constant. Five days before admission the left arm and elbow became swollen, hot and very painful. He was unable to move the elbow joint and held it in a semiflexed position in a sling. There were no other symptoms.

Physical examination revealed a well-developed and well-nourished man in no acute distress. The examination was entirely negative except for the left arm. The elbow was held in semiflexion, the upper arm was hot, puffy, edematous, but non-fluctuant. There were no palpable axillary lymph nodes. The arm was protected by the patient and held in semiflexion. The blood pressure was 130 systolic, 70 diastolic.

The temperature was 98°F, the pulse 80, and the respirations 20.

Examination of the urine was negative. The blood showed a red-cell count of 3,600,000 with 80 per cent hemoglobin (Sahli), and a white-cell count of 12,200 with 81 per cent polymorphonuclears, the blood smear was negative. The tuberculin test, using 0.1 cc of a 1:10,000 dilution, was negative. Two blood Hinton tests were positive, the Wassermann test negative. The blood nonprotein nitrogen and serum protein determina-

tions were normal. The spinal-fluid Wassermann and gold-sol tests were negative, the spinal-fluid protein was 14 mg per 100 cc.

Roentgenograms of the left humerus showed a loculated cavity involving the medulla of the mid-third of the shaft of the humerus about 13 cm in length. The cavity was fairly well defined in its lower end but poorly defined in its upper end where there was apparently some destruction in the adjacent bone. The cortex was destroyed



FIGURE 1 *Left Humerus the Day of Operation*

in at least three places and was thinned in others. There was marked rough periosteal new-bone formation over the lesion, as well as over the area of destruction at its upper margin. There was soft-tissue swelling about the lesion, and this appeared to be due to edema. An area of increased bone density lay close to the lower edge of the lesion. There was no evidence of pulmonary lesions. Films of the pelvis, bones of the hands, femora, tibia, knee joints and skull showed no abnormalities. Intravenous pyelograms showed several areas of calcification overlying the upper pole of the left kidney, and apparently outside it.

The patient ran an irregular, spiking type of temperature, ranging from 98.6 to 103°F. An x-ray film (Fig 1) taken about two weeks later, on the day of operation, showed essentially the same changes.

DIFFERENTIAL DIAGNOSIS

DR. FULLER ALBRIGHT I do not know much about bone disease of this type. May I see the x-ray films?

DR. AUBREY O HAMPTON I know the answer so I prefer that you ask questions.

DR. ALBRIGHT The periosteal proliferation suggests syphilis. We notice that the epiphysis of the bone is not involved. In other words, it is a midshaft process. I do not believe the calcification over the kidney can possibly be in the adrenal gland. Is that correct?

DR. HAMPTON Yes, it looks like a tuberculous node.

DR. ALBRIGHT I have no other questions. Have you any other comment not brought out by the description?

DR. HAMPTON No.

DR. ALBRIGHT What does one consider? The first possibility is tumor. The facts that there was no soft-tissue mass and that the lesion had lasted six years are against tumor, especially a Ewing tumor. There is no evidence of another type of tumor, hence tumor is unlikely. Secondly, one should think of infection. In the beginning the absence of fever was against infection, however at the time of admission the fever and white count were strongly in its favor. The various types to consider are tuberculosis, syphilis and chronic osteomyelitis. Tuberculosis does not usually start at the midshaft. The pain is somewhat against syphilis, but the positive Hinton test and the periosteal proliferation are in its favor. It is most unusual not to have a positive Wassermann test in active syphilis. I do not believe he had bone syphilis, but it remains a distinct possibility. The symptoms of chronic pyogenic osteomyelitis can be very obscure and these areas of increased density around the bone certainly look like those of osteomyelitis. The facts are consistent with such a diagnosis, and I do not believe it can be ruled out.

DR. HAMPTON What do you think of the sharp cystic appearance of the areas of rarefaction?

DR. ALBRIGHT It fades out up here, but, as you say, is sharp on this side. There is no sequestrum which if present would favor osteomyelitis, but I do not believe that sequestration necessarily occurs in osteomyelitis. This diagnosis cannot be ruled out and is my best bet.

The third possibility is bone cyst. However, the general appearance of the lesion is not like that of a bone cyst, and I do not believe it is going to turn out to be that. Why I say this, I do not

know, other than because it does not look like it to me.

DR. HAMPTON How about the periosteitis?

DR. ALBRIGHT Think you, the presence of periosteitis is strong evidence against bone cyst.

Somebody probably wants me to talk about the syndrome characterized by osteitis fibrosa disseminata, areas of pigmentation and precocious puberty in females.* He was brown all over so he could not have brown spots. It is not that syndrome anyway. When that condition involves the shaft of a bone, it goes to the metaphysis and is not confined to the middle of the bone. Some one might consider xanthoma. I have seen the disease in a case associated with periosteal proliferation, but in the absence of other bone involvement it is most unlikely.

Because of the fever and elevated white count I am going to stick to the diagnosis of chronic pyogenic osteomyelitis. My second choice is bone cyst.

DR. TRACY B MALLORY Dr. Albright's diagnosis agrees with that of the local practitioner who sent the patient in but its correctness was questioned for a long period of time in the hospital and many questions were raised. Have you any thing to add, Dr. Hampton?

DR. HAMPTON I am startled with the simplicity of the case. We had several conferences over this patient, one with the Tumor Clinic. We started out with the impression that by x-ray the lesion in the bone was more like that of syphilis than of any other disease. His clinical manifestations, however, were not typical, and then we thought perhaps it was tuberculosis of the shaft which does occur in Negroes, Chinese and certain Scotchmen. However, tuberculosis usually involves the ends of the bone instead of the midshaft. We ended up by believing the lesion was due to an infection. One member thought that a Ewing tumor was a definite possibility. It was not so simple to us as it was to Dr. Albright.

DR. GRANTLEY W. TAYLOR We had the problem of disposing of this patient and did not know in which of several directions to send him. He was on the osteomyelitis service, but Dr. Daland had the bone-tumor assignment, and the syphilologists began to "lick their chops" as soon as the positive blood test was returned. It seemed simplest to let the syphilologists try intensive antisyphilitic treatment. So this was carried out for a period of two weeks, without any striking improvement. Against the diagnosis of syphilis was the complete

Albright P.; Butler A. M.: II
characterized by osteitis fibrosa dis-
seminata, with precocious
puberty. *Medicine* 216: 77-78, 1931

P. Syndrome
characterized by
osteitis fibrosa dis-
seminata and
precocious
puberty.

freedom from other evidence of the disease. The arm symptoms had started six years before entry, at the age of nineteen, and hence if the process were due to primary syphilis, the disease must have been acquired at an earlier time, however, there was no history, and no other stigmas. We wondered if this might have been a false-positive Hinton test, and a syphilologist raised the question as to whether the febrile reaction might have accounted for the positive test. It was a very interesting possibility which I had not seen brought out before.

We tried aspiration with a needle and got nothing. Because of that we finally explored him. We got a copious immediate discharge of pus, and when a probe was introduced the length of the cavity, more pus was evacuated. Cultures showed *Staphylococcus aureus*. He went ahead to a very rapid, serene convalescence. He was discharged after two weeks, with no symptoms—a most bizarre convalescence for a case of osteomyelitis. Tissue was given to the Pathological Department, and I believe Dr. Mallory will tell us that it showed a distinctly benign sort of process for osteomyelitis.

DR. HAMPTON: What were the gross findings in the shaft?

DR. TAYLOR: There was a thickened, edematous, red, porky periosteum, with practically no cortex. We dropped immediately into an abscess cavity, and inside of that was the usual chronic inflammatory, granulation tissue.

CLINICAL DIAGNOSIS

Tertiary lues?
Osteomyelitis?

DR. ALBRIGHT'S DIAGNOSIS

Chronic pyogenic osteomyelitis

ANATOMICAL DIAGNOSIS

Chronic osteomyelitis of humerus, *Staphylococcus aureus*

PATHOLOGICAL DISCUSSION

DR. MALLORY: The clinical course, I think, is the most important proof that the *Staphylococcus aureus* was at least the immediate cause of this patient's difficulties, because as soon as the abscess was drained, as Dr. Taylor has pointed out, he had an immediate symptomatic improvement, which continued on to apparently complete cure. The material excised from the margins of the cavity appears to consist of granulation tissue, very heavily infiltrated with lymphocytes and plasma cells, there are quite a lot of lipid-filled cells, but not enough to make one think seriously of xanthoma. I think there is a possibility that something existed before the abscess developed, but I do not know any way of proving it.

DR. HAMPTON: This is not the first time our department has had considerable difficulty with a staphylococcal abscess. We have quite a series of them. They mimic bone tumors and practically everything else, especially when the lesion has been present a long time.

DR. ERNEST M. DALAND: You cannot find any evidence of syphilis?

DR. MALLORY: No. I should think if syphilis entered the case at all it was congenital rather than acquired.

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ANTI VIVISECTION

In an attractive illustrated folder the people of New England are being asked by the New England Anti Vivisection Society to support the cause of anti vivisection as being the cause of all right thinking individuals. Since most of us secretly pride ourselves on our right thinking we believe that this appeal is addressed to us.

We are told that thousands of people are learning for the first time that vivisection really means animal experimentation, that the path of cruelty does not lead to man's birthright, nor will man find relief from pain in the "broken and tortured bodies of those weaker than themselves and that among the victims of vivisection are not only animals but also "the less fortunate among human beings. A police dog looks out from the page with eyes of canine honesty. A kitten appears to typify helplessness. The human victims do not appear

This folder purports to be a sincere appeal to the people of New England to correct an evil by the abolishment of animal experimentation, a procedure which is motivated by cruelty and exists for the purpose of causing suffering to animals and unfortunate human beings. Need any intelligent person be disturbed by such an appeal?

The fight against cruelty in all its forms has always appealed and will always appeal to the best in human nature—of which, be it said in passing the medical profession has its full share. Experimentation on living creatures is essential to man's knowledge of disease on which in turn is based a large amount of what progress has been made against suffering and pain not only in human beings but also in animals. Should the misguided appeal of the New England Anti Vivisection Society fail to achieve the universal support of the people to whom it is addressed, such failure cannot fairly be credited to any lack of right thinking in New England.

SOURCES OF COMMON MEDICAL EPONYMS

THE most graphic and essentially the best description of a clinical syndrome or a medical procedure is commonly that given by its discoverer or originator in the first flush of his enthusiasm. He may not have known so much about the matter as hundreds of his successors, but what he said was the kernel about which subsequent knowledge grew. To give him the tribute of an eponym seems quite fitting and proper, and not unscientific, and hundreds of names of physicians and scientists are associated with various diseases, syndromes, signs, tests, anatomic parts, pathologic lesions and so forth. Such terms as Bright's disease, Horner's syndrome, Hegar's sign, Barany's test, McBurney's point and Brodie's abscess are constantly used by the medical profession, but few physicians have read the original contributions by Bright, Horner, Hegar, Barany, McBurney and Brodie in regard to these matters.

Some time ago, Dr. Robert W. Buck of Boston, submitted to the *Journal* a series of several hundred sources of common medical eponyms.

which he had collected over a period of years, and beginning with this issue, one will be published weekly. While the list selected by the editorial staff is purely arbitrary and makes no pretense of being encyclopedic, it is believed that the individual items are of sufficient general interest to constitute a valuable addition to the *Journal*.

MEDICAL EPONYM

ADAMS-STOKES DISEASE

Robert Adams (1791-1875), one of the surgeons to Jervis Street Infirmary, Dublin, describes "Cases of Diseases of the Heart, Accompanied with Pathological Observations" in the *Dublin Hospital Reports* (4 353-453, 1827). On page 391 appears the following:

February 20, 1822, I was called to visit a gentleman in my neighbourhood, aged 50 years, who had suddenly fallen down, as reported to me, in an apoplectic fit. I found him in a state of complete insensibility, his face (naturally pale and sickly) was now red and bloated, his breathing stertorous, with a slow pulse.

In the last year he had two apoplectic attacks, exactly resembling that which I had just witnessed from these he recovered without any paralysis of the muscles.

An officer in the revenue, aged 68 years, of a full habit of body, had for a long time been incapable of any exertion, as he was subject to oppression of his breathing and continued cough. In May 1819

I saw this gentleman. He was just then recovering from the effects of an apoplectic attack, which had suddenly seized him three days before. What most attracted my attention was the irregularity of his breathing, and remarkable slowness of the pulse, which generally ranged at the rate of 30 in a minute.

[During seven years he had been seen] in not less than twenty apoplectic attacks. He would then fall down in a state of complete insensibility. His pulse would become even slower than usual. He recovered from these attacks without any paralysis.

In both these cases apoplexy must be considered less a disease in itself than symptomatic of one, the organic seat of which was in the heart.

William Stokes (1804-1878) in his article "Observations on Some Cases of Permanently Slow Pulse," which appeared in the *Dublin Quarterly Journal of Medical Science* (2 73-85, 1846), refers to these case histories as follows:

In the fourth volume of the *Dublin Hospital Reports*, Mr Adams has recorded a case of permanently slow pulse, in which the patient suffered from repeated cerebral attacks of an apoplectic nature, though not followed by paralysis. The attention of subsequent writers on diseases of the heart has not been sufficiently directed to this case, which is an example of a very curious and, as there is reason to believe, special combination of symptoms.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

PUERPERAL SEPSIS FOLLOWING DELIVERY

Mrs M. F., a thirty-year-old para IV, was delivered normally at home on July 19, 1926. There had been some difficulty in extracting the placenta. Following delivery the patient was weak and apathetic. On July 20 the patient complained of a sharp frontal headache and a pain in the back of her neck, which was worse on motion. She was therefore admitted to the hospital.

The family history was not recorded. The patient's past history was not remarkable. The three previous deliveries had been normal, with uneventful puerperiums.

Examination on entry revealed the temperature 102.4°, the pulse 140, and the respirations 24. The patient was conscious, rational and co-operative. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The uterus was at the umbilicus, there was no tenderness, spasm or masses in the abdomen. The extremities were normal. The blood showed a white-cell count of 16,400, and the urine contained many pus cells.

She was given ice to the fundus, rectal fluids, urinary antiseptics, bladder irrigations and ergot. Improvement was gradual. For several days the temperature varied between 100 and 103°F, reaching a normal level on July 31. The white-cell count rose to 19,600 on July 26. The patient was discharged on August 8, completely recovered.

Comment. This is a typical case of uterine infection developing within thirty-six hours of delivery. The history states that some difficulty had been encountered in extracting the placenta. One does not know whether the placenta was extracted manually. If so, the infection was probably due to direct contamination. The patient's condition as described by the attending physician soon after delivery leads one to infer that hemorrhage was a complication. It is often true that patients whose temperatures rise within thirty-six hours are much sicker than those whose temperatures do not rise until after three days. No blood culture was taken. It is mentioned in the record that the patient was given ergot, it is not mentioned when the ergot

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

was discontinued. It must always be borne in mind that continued use of ergot is dangerous and that its value after a few days is probably negligible.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR NOVEMBER, 1939

| DISEASES | NOVEMBER 1939 | NOVEMBER 1938 | FIVE YEAR AVERAGE |
|---------------------------|------------------|------------------|----------------------|
| Anterior poliomyelitis | 7 | 0 | 14 |
| Chickenpox | 950 | 812 | 984 |
| Diphtheria | 28 | 21 | 28 |
| Dog bite | 533 | 656 | 605 |
| Dysentery bacillary | 36 | 9 | 13 |
| German measles | 135 | 30 | 62 |
| Gonorrhea | 426 | 421 | 514 |
| Lobar pneumonia | 269 | 233 | 260 |
| Measles | 857 | 597 | 384 |
| Meningococcus meningitis | 2 | 2 | 4 |
| Mumps | 248 | 207 | 347 |
| Paratyphoid B fever | 1 | 12 | 4 |
| Scarlet fever | 264 | 356 | 559 |
| Syphilis | 419 | 503 | 477 |
| Tuberculosis, pulmonary | 162 | 262 | 239 |
| Tuberculosis, other forms | 9 | 30 | 28 |
| Typhoid fever | 2 | 6 | 9 |
| Undulant fever | 5 | 5 | 3 |
| Whooping cough | 508 | 557 | 607 |

Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Adams, 1; Croton, 1; Haverhill, 1; Worcester 4 total 7.
Anthrax was reported from Peabody 1 total 1.
Diphtheria was reported from Boston 1 Cambridge, 4; Fall River 3; Foxboro, 5; Lawrence, 5; Lynn 1; Marlboro, 1; New Bedford, 1; North Andover 1; Revere, 2; Taunton, 1; Worcester, 3 total 28.

Dysentery bacillary, was reported from Arlington 1; Beverly 5; Boston, 1; Cambridge, 11; Chelmsford 1; Danvers, 12; Fall River, 2; Lowell 1; Lynn, 1; Malden 5; Medford, 69; Newton 2; Palmer 3; Russell, 1; Salem, 3; Waltham 4; Watertown 1; Westport, 3; Wrentham, 9 total, 135.

Malaria was reported from Boston 1 total 1.
Meningococcus meningitis was reported from Brockton, 1; Cambridge, 1 total 2.

Paratyphoid B fever was reported from Woburn 1 total, 1.

Pellagra was reported from Boston 1 total 1.
Pfeiffer bacillus meningitis was reported from Wakefield, 1; Worcester 2 total, 3.

Septic sore throat was reported from Boston, 3; Brookline, 1; Cambridge, 1; Malden 2; Merrimack, 1; Somerville, 1; Williamstown 1 total 10.

Trachoma was reported from Boston, 2; Cambridge, 1; Worcester 1 total, 4.

Trichinosis was reported from Ayer, 1; Boston 1 total, 2.

Typhoid fever was reported from Cambridge, 1; Saugus, 1 total, 2.

Undulant fever was reported from Beverly 1; Dighton 1; Gloucester, 1; Leverett, 1; North Adams, 1 total 5.

Diphtheria for the eighth consecutive month showed a higher reported incidence than for the corresponding month of the previous year.

Lobar pneumonia after four low months, showed an increase to slightly above the five year average.

Sonne (bacillary) dysentery continues to be reported at an unusually high level. All parts of the state have

been involved, with a concentration of reported cases in the Metropolitan Boston area.

Typhoid fever was reported at a record low level.

For the fifth consecutive month the reported incidence of scarlet fever reached a new low.

The reported incidences of pulmonary tuberculosis and tuberculosis (other forms) were well within the five year average.

Measles continued in its seasonal upswing reaching the highest reported November level for the previous five years.

There was nothing noteworthy about the reported incidences of anterior poliomyelitis, meningococcus meningitis, paratyphoid B fever, undulant fever, whooping cough, chickenpox, German measles and mumps.

REPORTS OF MEETINGS

BOSTON CITY HOSPITAL

On November 9, 1939 at the Boston City Hospital, Dr. A. C. Williams of the House Officers' Association presented Dr. George Crile, of Cleveland who discussed "Hypertension Can It Be Cured?" The importance of the problem is indicated among other things, by the actuarial statistics of several large insurance companies which show that fifty cents of each dollar paid in the past few years has been for deaths from hypertension and coronary and cardiovascular diseases.

Dr. Crile's unique approach to the subject resulted from his investigation of the explosion ten years before of some x-ray films which had been brought about by only a slight temperature rise. That led to a comparison of explosives, x-ray film, and protoplasm as regards composition. He concluded that the last was much like the other explosives qualitatively and was in a constant state of nitro-dinitrogenation influenced largely by the thyroid and adrenal glands.

Dr. Crile then undertook a ten year research into the reason for the susceptibility of the "civilized" person to certain degenerative diseases practically, if not entirely unknown to native tribes and animals. Over thirty-five hundred animals were obtained and weighed in toto, and their various organs were then weighed individually. It was an attempt fundamentally to determine wherein lay the "intelligence, personality and energy of man," and at tenness was directed primarily at the brain, sympathetic nervous system, adrenal glands and thyroid gland. The speaker had pictures demonstrating the gradual increase in size of these organs through the phylogenetic scale, with a great step forward being noted between the cold- and warm-blooded animals. This was not considered surprising since it has been estimated that 75 per cent of the daily food intake is used merely for the maintenance of the warm-blooded state. By far the largest celiac plexus was found in the lion and tiger which have developed this in response to their need for power and alertness for the "supreme effort" which characterizes their survival. Dr. Crile concluded from his exhaustive study that the size of the brain is proportional to the environmental temperature, its greater part being used for "sparking the body metabolism."

Although man did not head the list in regard to size of the celiac plexus, the ratios of the weights of the brain, thyroid gland and adrenal glands to the body weight showed him far in the lead. Thus, Dr. Crile believes, is the reason man is the world's most energized being and is one of the reasons for man's place in nature. Another factor is his unique ability to control his body heat by virtue of his great body surface, lack of natural body covering and unique faculty for sweating all over.

Furthermore, man was the only animal in whom the ratio of thyroid weight to the total body weight surpassed the adrenal ratio. Consequently he is not endowed with the tremendous capacity for energy outbursts of some of his animal counterparts but is instead a walking, thinking being with the singular and often undesirable tendency to work all day and worry all night.

Then Dr Crile attempted to determine whether animals obeyed any physical laws in regard to their metabolism. The only correlation following any such law was between the brain weight and the amount of energy produced in twenty four hours. Man and to a lesser degree the primates, were the only exceptions to the law, and since Benedict has ruled out mental processes as contributing any significant amount to human metabolism, this was taken as another indication that man really has a unique place in nature. The speaker considered this somewhat of an 'anatomical I Q' for man. The only drive peculiar to man is his thinking brain, and this may be the force, through the thyroid and adrenal glands, which causes diseases specific for civilized man.

The next step was the correlation of this natural history with the problems of cardiovascular disease which had prompted the extensive research. Dr Crile corroborated the well known fact that the larger size of the brain in civilized man is due to its increase in the 'thinking portion' of the organ over that of the aborigine. However, there was a concomitant increase of the thyroid and adrenal glands, and it was the size of the latter and the celiac plexus which attracted the attention of Dr Crile. Consequently, the weights of the ganglia were compared in known hypertensive states and in various other conditions. The preponderance of greater weights in the former disease was marked. This, then, concluded the speaker, was a point of attack on hypertension, an opportunity to correct the pathologic physiology by interruption of the anatomical pathway.

A total of 256 patients have been subjected to celiac ganglionectomy. Particular attention was focused on their early lives. It was found that their childhood differed from that of eventual thyrotoxic patients but that both were far different from normal children. Both groups were found to have been high tension, tireless children with many activities and ambitions. Those who later showed hyperthyroid tendencies, however, were, on the average, far superior academically. In both groups the people themselves seldom became fatigued but the integral parts wore out.

At first, the number of operative and postoperative fatalities made the success of the procedure questionable. With additional experience, however, Dr Crile and his associates have completed the past 127 cases without an operative death. The early misfortunes resulted from the technical difficulties of the procedure itself, the fall of the blood pressure to zero in some instances, and the permanent anuria from long-continued hypotension. To combat these complications, it was decided to give continuous intravenous glucose in distilled water, and perform the operation slowly and with meticulous care.

The average results three years postoperatively proved promising, stated Dr Crile, for the average blood pressure had fallen from 213 systolic, 130 diastolic, to 187, 116. The fine results in many instances, however, were neutralized by the failures in improperly selected cases. At that time there were no adequate criteria for operability, even those who had had apoplectic attacks being included. In spite of that, however, 55 per cent survived three years or more and 82 per cent returned to work, many in spite of lack of objective improvement. There was symptomatic relief in 88 per cent of cases, and this, Dr Crile opined, was due

to a damping of the patient's 'innate' drive, in spite of the progression of the already existing arteriosclerosis in many patients. In fact, it was doubtful in such cases if there was any prolongation of life. But just the relief from symptoms, which the speaker said he had come to realize were worse than those ascribed to terminal cancer, was considered a justification for the ganglionectomy. The decrease in cardiac deaths from 60 to 12 per cent was considered an indication for further study in the same direction.

Dr Crile's final suggestion was for an attempt at the prevention of hypertension by recognizing the children possessing the innate tendencies. These children should not be allowed to skip grades at school and engage in outside activities but should rather be urged to enjoy life in a wholesome way. The speaker stated that satisfaction of ambitions merely allows the inborn driving force with in the brain to cause hyperfunction of the sympathico-adrenal system, with resultant hypertension. It was pointed out that those practicing the Chinese philosophy in its classic form have practically no hypertension as compared with their countrymen in Hong Kong.

In discussion, Dr A. R. Kimpton asked if renal omentopexy might not be beneficial following the operation, in order to help the already damaged kidney. Dr Crile replied that such was an excellent idea.

A physician asked whether these patients lost their entire energy. But Dr Crile assured him that such was not the case, citing the instance of a successful surgeon who was still carrying on, albeit somewhat more slowly, after the removal of the largest celiac ganglion ever weighed. He said that there is a subjective loss of a certain drive, but the presence of a large initial amount makes the final result entirely acceptable.

NOTICES

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, January 10, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D., *Secretary*,
Medical Staff

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, January 16, at 12 o'clock noon. Dr Siegfried J. Thannhauser will speak on 'Obesity'.

Physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary*

PETER BENT BRIGHAM HOSPITAL

A research conference of the medical staff of the Peter Bent Brigham Hospital will be held in the amphitheater of the hospital on Tuesday, January 9, at 5 p.m.

PROGRAM

The Observations of Diuresis Produced by Hypertonic Sugar and Polyhydric Alcoholic Solutions.
Dr Philip Grabfield.

Toxemia of Pregnancy. Dr Lewis Dexter.

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, January 10,

from 2 to 4 p.m. Drs. Soma Weiss and Elliott C. Cutler will speak on "Chills." A clinicopathological conference conducted by Dr. Elliott C. Cutler will take place from 4 to 5 p.m.

On Thursday, January 11 from 8.30 to 9.30 a.m. there will be at the Peter Bent Brigham Hospital a combined clinic, conducted by Dr. Soma Weiss of the medical surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend.

TUMOR CLINIC BOSTON DISPENSARY

Each Tuesday and Friday morning 10.00 to 12.30 there is a meeting of the Tumor Clinic of the Boston Dispensary a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed and when there is an indication are treated with radium of high voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

BOSTON DOCTORS SYMPHONY ORCHESTRA



The Boston Doctors Symphony Orchestra will rehearse under Alexander Theide, former concert master with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra every

Thursday at 8.30 p.m., in Studio A Station WMLX 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr. Julius Loman Pelham Hall Hotel Brookline (BEA 2430).

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday January 9 in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance) at 8.15 p.m.

PROGRAM

Presentation of cases.

The Mechanism of Secretion in the Adrenal Gland.
Dr. H. Stanley Bennett.

Medical students and physicians are cordially invited to attend.

ROBERT M. ZOLLINGER, M.D. Secretary

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, Massachusetts will be held at "The Hut," on Friday afternoon, January 19 at 4.00. Dr. H. Houston Merritt will talk, his subject being "Syphilis of the Central Nervous System."

JOHN W. TRASK, Medical Director in Charge

SECOND ANNUAL CONGRESS ON INDUSTRIAL HEALTH

The Second Annual Congress on Industrial Health sponsored by the Council on Industrial Health of the American Medical Association will be held at the Palmer House Chicago on Monday and Tuesday January 15 and 16.

The congress will have a morning and afternoon session devoted to special topics each day. "Syphilis in Industry" will be discussed at the Monday afternoon session. "Physical Examination" on Tuesday morning and "Disability Evaluation" on Tuesday afternoon.

A dinner and round-table discussion on "Organization and Activities of Committees on Industrial Health in State and County Medical Societies" will take place on the first evening, January 15.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY JANUARY 8

MONDAY JANUARY 8
12.15 p.m.-1.15 p.m. Clinicopathologic conference. Dr. S. Burr Wolbach. Peter Bent Brigham Hospital amphitheater.
4 p.m. Physics and medical students are cordially invited to attend clinic presented by the medical, surgical, and orthopedic services of the Children's Hospital in the amphitheater of the Children's Hospital.

TUESDAY JANUARY 9
9-10 a.m. Certain Hematological Problems. Dr. W. Dameshek. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-1.30 p.m. Boston Dispensary tumor clinic.
12.15 p.m.-1.15 p.m. X-ray conference. Dr. Merrill C. Sosman. Peter Bent Brigham Hospital amphitheater.
5 p.m. Research conference of the medical staff. Peter Bent Brigham Hospital.
8.15 p.m. Harvard Medical Society. Peter Bent Brigham Hospital (Shattuck Street entrance).

WEDNESDAY JANUARY 10
9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
12 m. Clinicopathological conference. Children's Hospital amphitheater.
12 m. Monthly clinicopathological conference. Pathological amphitheater. Boston City Hospital.
2 p.m.-4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.

THURSDAY JANUARY 11
8.30 a.m.-9.30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital at the Peter Bent Brigham Hospital.
9-10 a.m. The Place of Electrocardiography in Clinical Diagnosis. Dr. J. M. F. Kner. Joseph H. Pratt Diagnostic Hospital.

FRIDAY JANUARY 12
9-10 a.m. The Present Day Specific Treatment of Pneumonia. Dr. Maxwell Finland. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12.30 p.m. Boston Dispensary tumor clinic.

SATURDAY JANUARY 13
9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12 m. Medical staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Soma Weiss.

SUNDAY JANUARY 14
4 p.m. Serious Accidents What to do and what not to do. Dr. Charles C. Lund. Free public lecture. Harvard Medical School amphitheater of Building D.

*Open to the medical profession.

JANUARY 5—United States Marine Hospital. Page 1001 issue of December 21.

JANUARY 6, 1935 8-11—American Board of Obstetrics and Gynecology Page 160 issue of July 27 and page 798 issue of November 16.

JANUARY 9—Research conference of the medical staff. Peter Bent Brigham Hospital. Page 38.

JANUARY 9—Harvard Medical Society. Notice above.
JANUARY 10—Joint medical and surgical clinic. Peter Bent Brigham Hospital. Page 38.

JANUARY 10—Monthly clinicopathological conference. Boston City Hospital. Page 38.

JANUARY 11—Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Page 38.

JANUARY 11—Pentucket Association of Physicians. 8.30 p.m., Hotel Earle's, Haverhill.

JANUARY 12—United States Marine Hospital. Page 1043 issue of December 28.

- JANUARY 14—Harvard Medical School free public lecture. Page 1042 issue of December 28
- JANUARY 14—Salem Hospital public lecture. Page 1042 issue of December 28
- JANUARY 15 and 16—Second Annual Congress on Industrial Health Page 39
- JANUARY 15 and 22—Cutter Lectures Page 1042 issue of December 28
- JANUARY 16—South End Medical Club Page 38
- JANUARY 19—United States Marine Hospital staff meeting Page 39
- JANUARY 22-25—American Academy of Orthopaedic Surgeons Hotel Statler Boston
- FEBRUARY 11-14—International College of Surgeons Page 759 issue of November 9
- FEBRUARY 22-24—American Orthopsychiatric Association Page 957 issue of December 14
- MARCH 2 JUNE 8 and 10—American Board of Ophthalmology Page 719, issue of November 2
- MARCH 7-9—The New England Hospital Association Hotel Statler, Boston
- MAY 10-18—American Scientific Congress Page 1043 issue of December 28
- MAY 14—Pharmacopoeial Convention Page 894 issue of May 25
- JUNE 7-9—American Board of Obstetrics and Gynecology Page 1019 issue of June 15

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

- FEBRUARY 14—Cough Sputum Hemoptysis—How shall they be investigated? Dr Reeve H Betts Essex Sanatorium Middleton
- MARCH 6—Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcal Infections Dr Champ Lyons Lynn Hospital Lynn
- APRIL 3—Addison Gilbert Hospital, Gloucester
- MAY 8—Annual meeting Salem Country Club Peabody

HAMPSHIRE

- JANUARY 10
- MARCH 13
- MAY 8
- Meetings are held at 11 30 a m at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

- JANUARY 10
- MARCH 20
- MAY 15
- Meetings are held at 12 15 p m at the Unicorn Country Club Stoughton

MIDDLESEX NORTH

- JANUARY 31
- APRIL 24
- JULY 31
- OCTOBER 30

NORFOLK SOUTH

- FEBRUARY 1
- MARCH 7
- APRIL 4
- MAY 2

All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon

PLYMOUTH

- JANUARY 18—Brockton Hospital Brockton
- MARCH 21—Goddard Hospital Brockton
- APRIL 18—State Farm
- MAY 16—Lakeville Sanatorium Lakeville

SUFFOLK

- JANUARY 31—Scientific meeting Subject to be announced later
- MARCH 27—Scientific meeting Symposium on Ulcerative Colitis and Diarrhea Under the direction of Dr Chester M Jones
- APRIL 24—Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

WORCESTER

- JANUARY 10—Worcester City Hospital
- FEBRUARY 14—Worcester State Hospital
- MARCH 13—Worcester Memorial Hospital
- APRIL 10—Worcester Hahnemann Hospital
- MAY 6—Worcester Country Club
- Each meeting begins with a dinner at 6 30 p m and is followed by a business and scientific meeting

BOOK REVIEWS

Functional Disorders of the Foot Their diagnosis and treatment Frank D Dickson and Rex L Divele
305 pp Philadelphia, Montreal and London J I Lippincott Co, 1939 \$5 00

The authors of this text very justly point out that the prevalence and economic importance of foot disorders are not sufficiently appreciated by the medical profession, that the profession treats them too indifferently, and that a large portion of the public has grown to consider the ailments as lying more directly in the province of such lay groups as chiropractors and shoe salesmen rather than in that of the family doctor. Unfortunately, there is altogether too much truth in these assertions. To help remedy the situation, this text is aimed principally as a guide for the practicing physician toward a clearer understanding of common foot disorders. Secondly, the authors seek to offer the non-medical practitioners an exposure of 'the primary causes of foot disorders and their legitimate limitations in carrying out treatment.' With this in view, it is explained that "only such material on the evolutionary development of the foot, on anatomy and on physiology has been introduced as seemed necessary to an intelligent understanding of the foot as a functioning organ." The aim which is thus expressed has been carried out most successfully, without limiting the completeness of the study.

The general causes of foot imbalance are first analyzed and then succeeding chapters are devoted to the special influence of the three age groups—children, adolescents and adults. As the etiologic factors are considered, the clinical applications are described in sections devoted to symptoms, exercises and treatment. A special chapter deals with "foot apparel," another to foot strapping, and one to examination of the foot. There are also chapters discussing the common affections of the foot in the skin, nails, heel and hallux.

In general, the great value of this book lies in the intelligent evaluation which it places on various methods of treatment. It does not adopt any iron-clad radical conservative rule, but reviews the various available corrective measures and selects that which is best suited to the particular type of case, whether by shoe corrective manipulation, stretching or operative procedure.

Studies from the Rockefeller Institute for Medical Research Vol 112 600 pp New York The Rockefeller Institute for Medical Research, 1939 \$2 00

Of special interest in this volume is the study by Ro and Kidd comparing the virus-induced rabbit tumors with the tumors induced by the application of coal tar. There is a striking similarity between both types of papilloma.

An interesting and carefully studied case of periarteritis nodosa is presented by Emerson and others. A study by White brings out the potentially unlimited growth of incised plant callus under artificial conditions.

The Story of a Baby Marie H Ets 63 pp New York The Viking Press, 1939 \$2 50

The author tells the story of a baby in a manner which will appeal to parents who wish enlightenment on a problem of this sort. It may also be read with much interest by high-school students and by laymen in general.

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CARDIO-OMENTOPEXY IN THE TREATMENT OF ANGINA PECTORIS*

Report of Two Cases

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BOSTON

CORONARY arteriosclerosis, with its major complication, coronary thrombosis, is one of the major causes of serious heart disease which all too frequently attacks men in the prime of life whose other organs are still intact and healthy. We neither understand the factors involved in the onset of this arteriosclerotic process nor can we control its progress. Furthermore, medical treatment for these cases is either of no value or at best but palliative. It is no wonder, then, that many have turned to surgery to seek some direct means for increasing the blood supply to the myocardium.

Any method, therefore, whose principle is the improvement of the coronary circulation by surgically establishing a new blood supply to it is worthy of serious consideration and trial. Such a principle has been evolved and carried out in this country by Beck¹ and in England by O'Shaughnessy², and although the principle of surgical revascularization followed by both has been the same, each surgeon has used different methods. Beck has developed a new blood supply to the heart by grafting to it a portion of pectoral muscle, whereas O'Shaughnessy has utilized a pedicled omental graft. To discuss all the voluminous clinical and experimental data bearing on this subject is beyond the scope of this report but certain studies may be cited.

It is of course well known that attempts have been made for many years to improve the lot of the patient suffering from angina pectoris by an indirect surgical approach to the problem. These efforts have not been attended by notable success,

so that operations on the sympathetic nervous system, which were at first encouraging, have since been demonstrated to be of little permanent value, and have been largely abandoned. For the same reason total thyroidectomy, designed for a similar purpose, has fallen into disuse.

Of recent years the clinical importance of the collateral blood supply to the heart has been emphasized by Hudson, Moritz and Wearn.³ From their work it would appear that coronary occlusion is compensated for by channels from the remainder of the coronary circulation as well as by collaterals from the mediastinal circulation. The latter circulation includes connections to the coronary circulation from the pericardiophrenic artery and the anterior mediastinal, pericardial, bronchial and esophageal branches of the aorta.

As has been stated by O'Shaughnessy,² it is clear that in many cases this collateral circulation is insufficient and that an infarcted area in the myocardium may go on to rupture within a few days, or may form a cardiac aneurysm which will sooner or later rupture from necrosis. In other cases a badly crippled heart is the result of the myocardial ischemia.

In cases where death does not follow coronary occlusion within a short time, the necessity for a compensatory and sufficient circulation to the myocardium is obvious. Although Spalteholz⁴ has shown a rich anastomosis between the right and left coronary trees, Leriche⁵ has demonstrated experimentally that the efficiency of the collateral supply from the coronary system is a direct function of the state of the systemic blood pressure. And, also in this connection, Mautz and Beck⁶ have recently shown a considerable variation in the degree of intercoronary anastomosis in the normal heart.

Utilizing a new technic of injection and dis-

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section, Schlesinger⁷ has recently shown that anastomoses develop readily whenever and wherever arteriosclerotic narrowing or occlusion causes obstruction in the coronary artery circulation. These anastomoses are localized to the regions where they are needed. He concludes, moreover, as a result of these studies: "The coronary arteries, in *normal* human hearts, even senile hearts, are true Cohnheim end arteries, without anastomotic connections, such anastomoses do not develop *pari passu* with increase in age."

As regards the collateral extracoronary sources of blood supply, it has long been known that pericardial adhesions may be effective in the conduction of such new channels to the heart. Thus, Beck, Tichy and Moritz,⁸ who experimentally produced broad areas of adhesions between the heart and the pericardium of dogs, found that the animals were able subsequently to survive almost complete occlusion of both coronaries through the use of silver bands. In man there is also convincing evidence which tends to corroborate the fact that visceroparietal pericardial adhesions efficiently aid the circulation to the heart. The formation of such adhesions in a given case of coronary occlusion, however, would seem to be a purely fortuitous circumstance. This is borne out by the autopsies on 83 cases of coronary occlusion reported by Parkinson and Bedford,⁹ in which there were but 11 cases of pericarditis. Injection studies by Hudson, Moritz and Wearn⁸ demonstrated the vascular connection between myocardium and pericardium when such adhesions existed.

From the foregoing experimental and other data, then, it would seem that if the heart muscle is to survive in some cases of coronary occlusion, sooner or later a rich blood supply, in the form of a collateral circulation, must become available to the myocardium. We have seen that such a compensatory circulation may form in the natural history of the disease. Indeed, as has been stated by Hochrein¹⁰: "We have learned to recognize that pericarditis is not a complication of coronary thrombosis but a natural attempt at healing—its presence is to be welcomed rather than deplored."

When adhesions do not form as a natural sequence, and when there is myocardial impurment as manifested by symptoms of cardiac ischemia, it would be desirable if the theoretical possibility of establishing such adhesions, and thereby improving the collateral circulation, could be brought to a practical clinical application. This has been effected by surgeons in this country and in Europe.

To Beck must go the credit for being the first surgeon to make an attempt at revascularization of

the ischemic heart in the human subject. He had observed that adhesions were capable of carrying blood to the human heart when he divided such adhesions at operation and found that they bled profusely. He was also familiar with the published data of cases where death was due to other causes, in which the heart was found to have both coronaries completely occluded and pericardial adhesions were present. As a result of these and other experimental observations, Beck, using the pectoralis major muscle as a pedicled graft, attempted to bring a new blood supply to the heart in a human subject. In this he was notably successful, his first patient, a totally incapacitated farmer, operated on in February, 1935, being able to return to physical labor, free of pain, after a suitable postoperative period.

At the same time, in London, O'Shaughnessy was proceeding with experiments on cardiac grafting. Instead of muscle he used a pedicled omental graft. It has long been recognized that the omentum is the only structure in the body with the specific property of vascularization, and as a result of his accumulated experimental evidence as to the vascularizing power of the cardio-omental graft, O'Shaughnessy was convinced of its superiority over other structures available for the same purpose. Beck had also used the omentum as a graft in experimental animals.

In 1936 O'Shaughnessy published the results of a series of omental grafts in the racing greyhound. In the paper he showed that greyhounds which had previously been subjected to ligation of the left coronary artery and to a cardio-omentopexy were able to chase the electric hare around a full course (526 yards) without distress. By injection methods he demonstrated conclusively the vascular connections between the grafts and the coronary trees of the animals. Grossly, these were manifested by the appearance of the injection mass at the orifices of the coronary arteries when the sole vascular attachment to the heart was the omental graft through which the injection was made. Histologically, the new vessels were shown to extend to the deeper branches of the coronary artery, even under the endocardium.

In 1938 O'Shaughnessy reported on 20 human cases. In this series the patients selected for operation showed what he considered to be unequivocal evidence of cardiac ischemia and had failed to benefit by medical treatment. Fifteen of these patients were suffering from angina pectoris, and of these 10 received cardio-omentopexy, 3 pericardiectomy with insertion of an irritant (aleuro-nat), 1 cardiopneumonopexy, and 1 died on the table before the operation was fairly begun. There

were 5 deaths, only 1 of which was the direct result of operation. The other 4 occurred two months or more after operation as a result of uremia, pulmonary infarct, pneumonia and empyema, and 'no apparent cause,' respectively. Of the 10 patients who survived, 8 enjoyed freedom from angina, and 7 of the latter returned to work.

O'Shaughnessy has thought that the control of postoperative shock is an easier matter following cardio-omentopexy than following Beck's operation, because of the extensive dissection of the pectoral muscles which is a necessary preliminary to the latter procedure. Moreover, the operation is less time-consuming, and, other factors being equal, the omentum is obviously a better vascularizing agent than is the pectoralis major muscle.

Because of these various considerations, we have concluded that cardio-omentopexy, when feasible, is the operation of choice for the establishment of a new blood supply to the heart by surgical means. We have performed it in the two cases to be reported.

SELECTION OF CASES FOR OPERATION

As may have been gathered from the foregoing discussion, no hard and fast indications for the selection of cases for operation have as yet been outlined. The final decision as to suitability for operation must rest with the cardiologist. From the surgeon's viewpoint, patients with angina are notoriously bad risks for operation by virtue of the very condition for which it is to be performed. This aspect, therefore, is a constant when arriving at a decision.

Other than this, however, we have insisted upon the fulfillment of several requirements. In so far as it is possible to determine, there must be, first, indisputable evidence of coronary heart disease with angina pectoris. Strict observance of this rule will we believe, supply the necessary base line for the evaluation of the operation as a therapeutic measure. We insist, at present, that the patient be under sixty years of age and not obese. Serious complications in other organs are, of course, contraindications. We have rejected, and will continue to reject, patients with marked hypertension and cardiac enlargement.

If the patient fulfills the foregoing requirements, he is observed during a control period of one month, during which time exercise-tolerance and other tests are made.

We also are of the opinion that patients who give evidence of congestive failure are not suitable candidates for operation. Beck operated on a man in failure. He simply performed pericardi-

ectomy and introduced powdered beef bone for the purpose of increasing intercoronary communications or adding new capillary anastomoses from the pericardial fat. This patient stood the operation, but remained in failure and died four months later. Apparently the operation did nothing, one way or the other. We agree with Beck that the patient with coronary disease who is in failure is not a suitable person for operation.

With these patients the problem of weighing the immediate risk of operation against the prognosis without operation is a particularly difficult one. This is due to the fact that, as yet, time and the number of cases have not permitted an imposing array of figures from which to draw conclusions, and also to our inability to offer on the basis of the evidence at hand a sound prognosis in the absence of operation.

O'Shaughnessy has enlarged the scope of his indications to include 5 cases of non anginal cardiac ischemia but at the time of reporting, the operations had been too recently performed for conclusions to be drawn. There was 1 death, and 1 patient was able to return to work.

At the present time O'Shaughnessy¹¹ believes that cardio-omentopexy is relatively safe in the following circumstances:

A lapse of about six months after an attack of coronary thrombosis in patients with a clear previous history who are aged forty five to fifty five.

Specific aortitis with angina, provided the heart is not enlarged to any great extent.

Hypertensive heart failure, with the same proviso.

However, at least for a time, we prefer to confine ourselves to the narrower indications given earlier and limit our operations to patients having unrelievable angina pectoris.

TECHNIC OF OPERATION

Our procedure has been as follows when operation is decided on. For several days prior to operation the patient receives 3 gr. of quinine sulfate three times daily, in order to reduce the irritability of the heart. Morphine sulfate is given in suitable doses preoperatively. After induction of anesthesia with ether vapor and oxygen an intra tracheal tube is introduced and connected to the anesthesia machine in a closed system so that differential pressure may be used.

The patient is placed in the dorsal recumbent position and an incision is made over the fifth left intercostal space extending from the mid sternal line to the anterior axillary line. The left pleural cavity is entered through the fifth interspace, and after the fifth and sixth cartilages have been divided at the chondrosternal junctions

(Fig 1) the Sauerbruch rib-spreader is placed. The left lung, if free of adhesions, will drop posteriorly as it collapses and allow an ample view of the pericardium (Fig 2).

The phrenic nerve is identified on the pericardium and crushed lightly for the width of a

great importance to avoid penetrating the entire wall of the ventricles.

When the omentum is widely covering the left lateral aspect of the ventricles, its edges are sutured to the cut edges of the pericardium and also to the inferior pericardiosternal ligament (Fig 4).

The lung is next reinflated and the wound in the chest wall is closed in layers in the usual airtight manner, employing interrupted perichondral

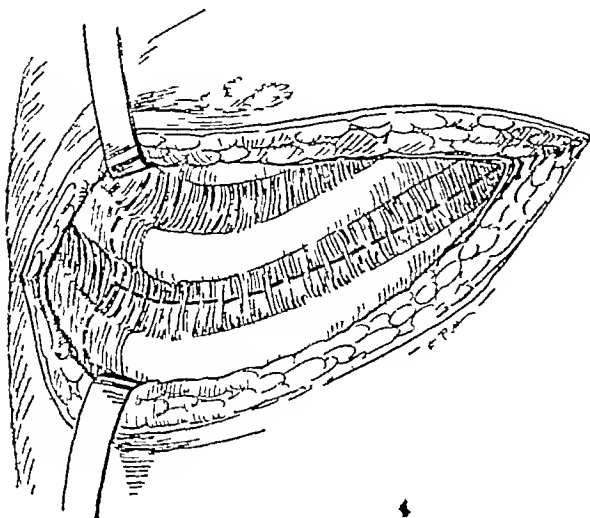


FIGURE 1

This drawing illustrates the line of incision in the fifth left intercostal space. The cartilages are divided close to the sternum.

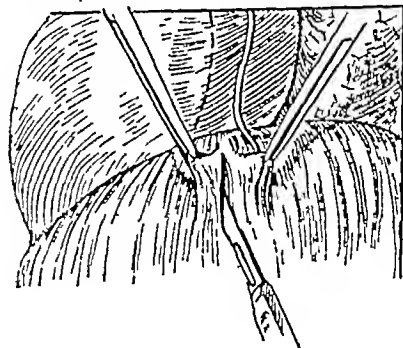
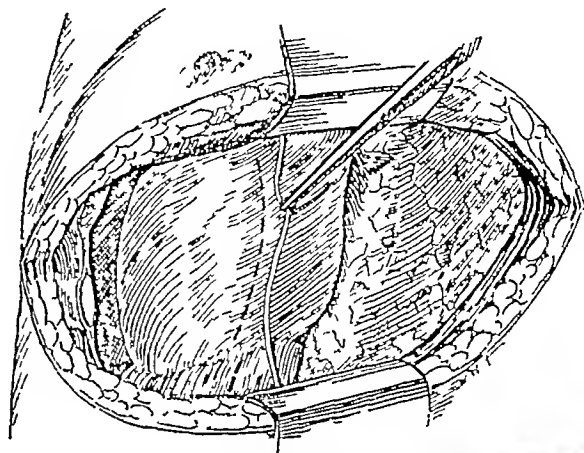


FIGURE 2

In this drawing the ribs have been retracted and the lung has fallen backward, exposing the pericardium. The phrenic nerve is being pinched as it lies on the pericardium. The dotted line indicates the incision to be made in the pericardium and the direction of the incision in the diaphragm. The insert shows the diaphragm being incised, when it has risen into view after paralysis of the left phrenic nerve.

hemostat. This causes the left hemidiaphragm to rise into view (Fig 2).

An opening is then made through the diaphragm in the direction of its fibers reasonably close to the pericardium and 5 cm long. Through this opening the fingers deliver a suitable piece of omentum for attachment to the heart muscle. It is desirable that the omentum be pulled up until its lower margin can be obtained, and not grasped near the colon. Care must be used that undue tension on the transverse colon is avoided. The colon must not enter or encroach on the diaphragmatic opening (Fig 3).

When sufficient omentum has been delivered through the diaphragm to cover the area of myocardium to be grafted, steps must be taken to close the diaphragm about the omentum and to prevent a later herniation of abdominal organs into the pleural cavity. In each of our cases we placed many interrupted silk sutures about the opening in the diaphragm in order to include the omentum and shut off the pleural cavity.

The pericardium is next opened (Fig 3), and the omental graft is sutured to the heart muscle with interrupted silk sutures placed over its flat surface. The graft should be placed so as to overlap the branches of the right and left coronary vessels. Care must be taken to include no branches of the coronary vessels in the sutures. It is of

braided-silk sutures. At the conclusion of the operation, as in any intrathoracic procedure, it has been our practice to insert a needle and withdraw any trapped residual air from the pleural cavity, thus adjusting the inspiratory and expiratory pressures to their normal negative levels.

POSTOPERATIVE COURSE

The postoperative course has been remarkably uneventful in our two cases. We believe it important to maintain the blood pressure at a constant optimum level, in order to prevent stagnation and thrombosis in the coronary circuit, and to that

end the pressure is observed at very frequent intervals (every five to fifteen minutes) during the immediate postoperative hours. If the pressure shows any tendency to fall, 0.2 cc. of 1:1000 adrenalin solution is administered hypodermically. Quinidine sulfate is continued by mouth.

The pulse is usually paradoxical for a few days, and there may be irregularities of varying degree. Continuous nasal oxygen is administered, and the water balance is maintained by proper amounts of suitable fluids given parenterally. Fluid may accumulate in the chest, and if embarrassing to the patient may be removed.

COMPLICATIONS

In our first case, diaphragmatic hernia, from which acute obstructive symptoms arose, necessi-

in a case in which grafting had been performed two years previously. The patient, a woman, had died from chronic alcoholism with neurological and psychological symptoms, but apparently the diaphragmatic hernia had never given trouble. In our case the fundus of the stomach was incarcerated,

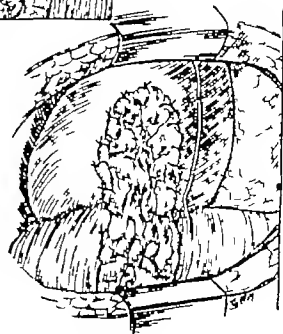


FIGURE 4

The insert shows the surface of the omentum being sutured to the myocardium with multiple silk sutures avoiding the branches of the coronary vessels. The lower drawing shows the suturing of the graft to the myocardium completed. Note the cut edges of the pericardium sutured to the omental graft in order to encourage further vascular anastomosis.

FIGURE 3

The insert shows the incision in the pericardium. Usually the tense pericardium retracts markedly thus exposing the heart. A suitable portion of omentum has been drawn through the diaphragm into the thorax. The dotted lines indicate the mattress sutures from side to side in the diaphragmatic incision through the substance of the omentum. The ends of the incision in the diaphragm have been sutured to bring it snugly about the omentum.

tating operative intervention, occurred six months after cardio-omentopexy and resulted in death. O'Shaughnessy¹¹ states that this complication has never been observed in any of his experimental animals, but that a hernia was found at autopsy

and the patient was having bloody vomitus when he re-entered the hospital. The hernia was reduced and repaired by the abdominal route, but the patient died forty five minutes after his return to the ward.

Certainly the technic of this operation must be seriously concerned with the prevention of post-operative diaphragmatic hernia, as well as with the attachment of omentum to the heart. We intend to do two things in the future to prevent such herniation. First, we shall do more careful suturing of the omentum to the diaphragm and of the ends of the incision in the diaphragm, since it seemed to us that in our first case the hernia opening in the diaphragm at autopsy was much larger than the original incision. Second, we in-

tend to run several crisscross silk sutures through the substance of the omentum placed in such a way as to include the sides of the opening in the diaphragm (Fig 3). We shall not tie these sutures tightly enough to embarrass the circulation in the omentum. We expect that their presence will prevent herniation through the diaphragm.

In spite of presumably ample preoperative medication, the excitement and apprehension effected by bringing the second patient to the operating floor precipitated a severe attack of angina pectoris. Because of this it was necessary to postpone the operation for a week. The patient was not informed of the date set for operation, he was given Avertin by rectum in bed and brought to the operating room unconscious, after the manner of a "thyroid steal." The operation was performed without incident.

RESULTS OF OPERATION

O'Shaughnessy has now done fifty grafts but states that he will make no statistical analysis until he has done one hundred. His last reported series has been previously mentioned.

Beck, using pectoral muscle grafts, has operated on 25 patients. Of these, 16 are living and 9 are dead. The mortality rate in the first 12 cases was 50 per cent, and in the last 13, 15 per cent. Thirteen patients were observed for five months or longer after operation. There were no patients who were not improved by operation. Three had no pain, required no medication and had definitely increased exercise tolerance. Nine had pain, which was less severe, and took occasional medication, and the exercise tolerance was increased. One had some relief of pain and a slight increase in exercise tolerance.

In our two cases, whose histories follow, there was no operative mortality. The first patient died six months after cardio-omentopexy as a result of the repair of the diaphragmatic hernia. Following the primary operation he had had great relief from pain, required no drugs and showed a marked improvement in exercise tolerance.

The second patient has now lived for thirteen months since operation. He still has pain, which is less severe, requires some medication and has a greatly improved exercise tolerance. O'Shaughnessy states that improvement may be expected for twelve to eighteen months after operation.

CASE REPORTS

CASE 1 C W, a 44 year-old, Swedish salesman, was admitted to the Evans Memorial on May 18, 1938. For the previous 2 years he had had substernal pain and oppres-

sion. During the last 6 months he had noted that less and less exertion produced the pain, so that eventually he could not walk across the street without having any. The electrocardiogram showed changes consistent with coronary heart disease, and there was suggestive evidence of an old infarction. The patient was transferred to the Division of Thoracic Surgery and on June 8, cardio-omentopexy was performed, uneventfully. The postoperative period was remarkably smooth and he was returned to the Evans Memorial for further medical observation on June 30. He was gradually allowed activity and was discharged to his home July 30.

From this time onward there was a progressive improvement in the exercise tolerance, so that about September 1, the patient was able to return to part-time work. He had some pain, but it was minimal, and a great deal more effort was required to bring it on. He boasted about his "new heart" to his friends. About October 1, he first noted discomfort after eating. About December 1, he had fullness in the left upper quadrant after every meal, with cramp-like pain radiating through to the left scapular region. He re-entered the hospital December 25 with evidence of acute gastric distress, vomiting some bloody mucus. It seemed evident that he had high obstruction, probably due to herniation through the diaphragm.

After suitable preparation, the patient was operated on December 28. A laparotomy was performed and the proximal third of the stomach was found herniated through the hiatus created by the cardio-omentopexy. This was repaired easily and the patient was returned to the ward in good condition. He died suddenly 45 minutes after his return to bed.

Autopsy was performed by Dr. Charles Branch. Microscopical study of sections at the site of the graft showed a rich capillary growth from it into the myocardium. There was extensive fibrosis of the myocardium, with multiple areas of old infarction.

CASE 2 J K, a 53-year-old, Lithuanian, Jewish shoe maker, was admitted to the Evans Memorial on October 15, 1938. For approximately 1 year prior to entry he had been suffering from typical attacks of angina pectoris. He experienced some relief of his pain with nitroglycerin and medical measures until March, 1938, when he had an attack lasting for 15 minutes. Since that time the attacks had been more frequent and the pain had developed on less and less exertion. The electrocardiogram was typical of coronary heart disease and the exercise-tolerance test was low. The patient continued to have attacks of anginal pain of varying degree while in bed under observation.

The patient was accepted for cardio-omentopexy and was brought to the operating floor on November 6. However, excitement and apprehension precipitated an attack of paroxysmal auricular tachycardia with a resulting status anginosus, and the operation was postponed. On November 15, Avertin was instilled into the rectum while the patient was still in bed on the ward. He was then brought to the operating room and cardio-omentopexy was performed without incident.

Other than for some urinary retention, requiring constant drainage for a week, the postoperative period was entirely uneventful. The patient was transferred back to the Evans Memorial on December 5, and was discharged to his home, greatly improved, January 28, 1939.

He was last seen in November, 1939, at which time, he was improved as to exercise tolerance and as to the amount and frequency of his pain, and had returned to part time work.

SUMMARY AND CONCLUSIONS

The experimental and clinical basis for attempting revascularization of the ischemic heart is briefly considered.

The indications for and technic of cardio-omentopexy are presented, and the complications discussed.

Two cases in which cardio-omentopexy was performed are reported.

Many more patients must be operated on before any sweeping conclusions may be drawn, but on the basis of the work already done we are encouraged to believe that the principle of revascularization is sound. At the present time, we believe that we should be concerned with establishing the fact that an adequate blood supply can be brought to the heart, regardless of the method used. When this has been definitely shown to be possible and physiologically efficient in the human subject, the method will become important.

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ACUTE PANCREATIC NECROSIS*

A Clinical Lecture

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I WISH to discuss a very interesting disease and to point out the advances made during the past decade in its diagnosis and treatment. I refer to acute pancreatic necrosis. I once heard Dr. Osler say that in presenting the subject of a particular disease to students it is always well to take an actual case as a text. Through the kindness of Dr. Putnam Kennedy, of the Boston City Hospital, I am able to follow this advice as I have before me the records of an instructive case which was studied there only a few weeks ago, and which through the courtesy of Dr. Soma Weiss I have permission to report. It illustrates most satisfactorily the newer knowledge in diagnosis and treatment.

CASE REPORT

The patient, a 43-year-old woman was admitted last October suffering from bronchial asthma, a pulmonary infarct and phlebitis of the left saphenous vein. During the latter part of her hospital stay she complained mildly of vague gas pains in the epigastrium. She was discharged in early November but readmitted on November 12, in a state of shock. The previous night she had felt sudden

severe pain in the midepigastrium followed by continuous vomiting of colorless thin fluid. Pain continued throughout the night, increasing in severity, and in the morning the vomiting became more severe. Pain radiated from the midepigastrium into both upper quadrants and later involved the entire abdomen and the midback. The patient was brought to the hospital in an ambulance and when seen on the admitting floor was apparently in extremis. She was well oriented and able to recognize her surroundings but rapidly became pulseless with an audible heart rate of about 80. On two occasions she stopped breathing but recovered after coramin and 50 per cent glucose had been administered intravenously.

Shortly after admission the pain extended to the cardiac area and to both shoulders. At physical examination the abdominal wall was thin and lax. There was no muscle spasm but great tenderness over the entire abdomen especially in the upper quadrants where it was more marked on the right than on the left. The rebound tenderness was most marked in the right upper quadrant. There was also tenderness over both shoulders. At 9 p.m. the temperature was 97.6 F, the respirations 28 and the pulse 70. The leukocyte count was 18,400. The urine was free from albumin and sugar and contained bile but no urobilinogen. The diagnosis on admission was "acute surgical abdomen" due either to a ruptured gall bladder or to acute pancreatic necrosis.

The following day, November 13, the temperature was subnormal. The urine still contained considerable bile. The urinary diastase was 256 units (Fig. 1). Dr. Stanley J. G. Nowak saw the case in consultation and noted tender

Delivered at the first meeting in the auditorium of the Joseph H. Pratt Diagnostic Hospital, December 6, 1938.

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ness in both flanks, especially in the left over the tail of the pancreas. This, together with the febrile response, the presence of bile in the urine and the improvement with conservative treatment, led him to make the diagnosis of acute pancreatitis. Dr Irving J. Walker agreed with this diagnosis, as did Dr Weiss, who noted maximum pain in the upper abdomen, particularly to the left just below the costal margin. On November 14 the urinary diastase fell to 64 units, which is the upper limit of normal. The icteric index was 5. The temperature rose to 100.6°F (axilla), and the pulse to 104. There was a trace of bile in the urine. After this date, bile was no longer present, but urobilinogen, first noted November 13, was found in increasing amounts until November 20. On November 16 there was still tenderness over the entire upper abdomen and in both flanks. The following day fluid was given

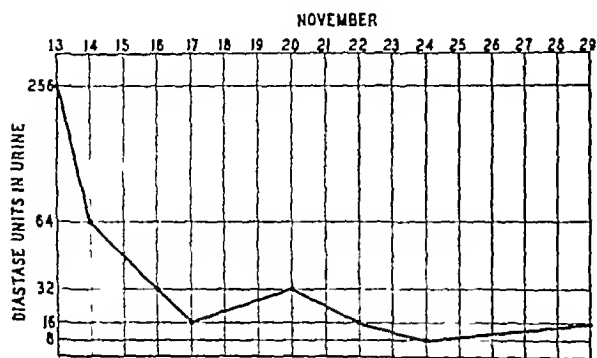


FIGURE 1

by mouth for the first time since admission, beginning with 1 teaspoonful of water every hour. The fasting blood sugar was determined for the first time that day and was 70 mg per 100 cc. The patient made a good recovery.

SYMPTOMS AND SIGNS

The first and most important symptom of acute pancreatic necrosis is pain. It is severe, often agonizing, not colicky but continuous and usually unrelieved by morphine. Moynihan¹ asserts that the pain is the most severe type of any resulting from abdominal disease and is attended with the most profound collapse. The location of the pain is significant. It is in the upper abdomen, usually in the epigastrium. Sometimes, as in the case reported, it extends across the entire front of the abdomen. It often radiates to the left back and occasionally, as here, to the midback. Brocq² maintains that the extension of the area of pain across the abdomen is an indication of an involvement of the entire pancreas, if the necrosis is confined to the head of the pancreas, the pain is to the right of the midline.

Vomiting accompanies the pain in almost all cases. This patient vomited repeatedly. When there is a great deal of hemorrhage into the pan-

creas, some blood may pass from the pancreatic duct into the duodenum and appear in the vomitus. Usually, however, as in this case, there is nothing distinctive in the character of the vomitus. On inspection the patient appears very ill. Sometimes there is cyanosis of the lips. There is a striking contrast between the severity of the condition and the scarcity of objective findings. At onset the temperature is normal and the pulse, although weak, may be little if at all accelerated. In a day or two moderate fever develops. There is tenderness in the epigastrium but no muscle spasm as a rule. A soft abdomen which permits deep palpation is characteristic. The location of the tenderness is often an aid in the diagnosis of acute pancreatic necrosis. The late Daniel F. Jones,³ one of our ablest diagnosticians, whose opinions were based on an unusually great experience with acute pancreatic necrosis, held that the most satisfactory aid in making the diagnosis was the careful determination of the location of tenderness. He wrote:

It is not enough to say there is tenderness in the upper abdomen. Given symptoms suggesting gall bladder disease, the diagnosis of pancreatitis should be made correctly in a high percentage of cases if there is tenderness extending to the left from the gall bladder. This can be accomplished only by meticulous care as to the amount and extent of the tenderness. Experience is necessary, of course, to make this distinction, and yet a former resident, of very moderate hospital experience, made a correct diagnosis in the next two cases that were admitted after he had been taught this method of diagnosis.

The clinical picture of what Dieulafoy⁴ calls *le diame pancréatique* has been drawn by many writers in different countries, and there is a striking similarity in their descriptions. An obese person of middle age addicted to alcohol and with a history suggesting cholelithiasis is suddenly seized shortly after a heavy meal with agonizing pain in the epigastrium, accompanied by vomiting. The pain continues, unrelieved by morphine, and vomiting persists. Signs of collapse appear. The temperature and pulse are not elevated. Aside from epigastric tenderness nothing of significance is found on examination of the abdomen. Symptoms continue many hours without abating.

Until the introduction of the diastase test the correct diagnosis was usually made at operation or autopsy. In a series of 121 cases analyzed by Brocq,² the diagnosis of acute pancreatic necrosis was made in only 21. It was most commonly mistaken for perforation of a peptic ulcer (25 cases),

for ileus (23 cases), for peritonitis (15 cases), for appendicitis (13 cases) and for cholecystitis (11 cases). One physician mistook the case we have discussed for a rupture of the gall bladder. All the others of the staff made the correct diagnosis at their first examination. If, as stated, the symptoms of acute pancreatic necrosis are characteristic, it is a fair question to ask, Why is the diagnosis usually missed? The chief reason is that owing to its rarity it is not considered. Undoubtedly mild cases are often overlooked, and typical severe cases are certainly rare. Halsted, the distinguished Johns Hopkins surgeon, told Brown⁸ that he was eager to make a preoperative diagnosis of acute pancreatitis before he died, but his wish was not gratified. He saw only 2 cases, in neither was pancreatic disease suspected, and in both the correct diagnosis was determined only by exploratory operation. Körte⁹ said that surgeons fail to recognize the disease because they forget that every sick man has a pancreas. Garrod¹⁰ expressed the same thought when he wrote "The chief difficulty in diagnosing disease of the pancreas is in thinking of the pancreas."

Knowledge of etiologic factors should be an aid in diagnosis. The disease affects men and women about equally. There were 182 men and 150 women in Brocq's series. In the largest collection of cases assembled (Schmieden and Sebening⁸) 77 per cent of the patients were women. Most cases occur between the thirty fifth and fifty fifth years. The frequent association with biliary disease is undoubted. In some German clinics this is as high as 90 per cent. The percentage is much lower in some studies. Myers and Keefer⁹ found only 10 cases of biliary disease among 48 cases of acute pancreatic necrosis collected from the records of the Mallory Institute of Pathology at the Boston City Hospital. Jones¹ found that 22 cases of acute pancreatic necrosis at the Massachusetts General Hospital occurred in patients without gallstones. In a review of 38 cases of acute pancreatic necrosis that came to autopsy at the New Haven Hospital (Weiner and Tennant¹⁰) there was extra hepatic disease in only 6, or 16 per cent. In 25 cases (66 per cent) alcoholism was an associated factor.

PATHOLOGY

Twenty years ago I¹¹ wrote in the section on diseases of the pancreas in *Oxford Medicine*

The severe, acute disease of the pancreas often called acute hemorrhagic pancreatitis is unlike that of any other organ because the disease is due to the destructive action of the pancreatic juice on the very tissue that formed it and the general symptoms that occur

result from the absorption of toxic bodies produced by this autodigestion.

Opie and Meakins¹² in 1909 used the term acute hemorrhagic necrosis, but acute pancreatic necrosis (Guleke¹³) or acute toxic necrosis of the pancreas seems preferable, as the lesion is not always hemorrhagic. Brocq³ calls it *pancréatite aigue aseptique*—a good term because it emphasizes the non-bacterial nature of the disease. As early as 1909 Opie and Meakins pointed out the essential fact that the disease is not an infection but an intoxication. This truth has gained acceptance slowly, and some surgeons even today still falsely call the disease an infection. Nordmann¹⁴ emphasizes the importance of a knowledge of the pathology of the disease as a basis for correct ideas in regard to treatment. He says that so long as one speaks of pancreatitis and continues to regard the disease as one of inflammatory origin, and plans surgical procedures according to this conception, so long will he travel a false path. Autodigestion of the pancreas through activation of the pancreatic juice is the cause of the edema, necrosis and hemorrhages in the gland. Producing occlusion of the pancreatic ducts in dogs by ligatures applied with every aseptic precaution is followed by the speedy production of acute pancreatic necrosis in a large percentage of cases. This I know, since I have lost quite a number of dogs when the pancreatic ducts were tied for this purpose. These experiments disprove the theory that the introduction of infected material into the pancreatic ducts from the common bile duct is essential to the production of the disease, and they prove conclusively that trypsin can be formed readily within the gland from the inactive trypsinogen.

How the disease arises clinically remains a mystery. Many factors are probably concerned. The pancreatic duct is rarely found to be stained with bile at autopsy. Furthermore, the pressure in the duct is higher than that in the common duct during digestion, and pancreatic ferments have been recovered from the gall bladder in a considerable proportion of the cases examined. The common-channel theory of Opie explains very few cases. Many years ago Archibald¹⁵ suggested that spasm of the sphincter of Oddi might lead to the entrance of bile into the pancreatic duct, with the resulting development of acute pancreatic necrosis, and supported his theory by experimental evidence. Wangensteen and his associates¹⁶ have shown that by closing the sphincter of Oddi in cats by a ligature the stimulus furnished to the contractile mechanism of the gall bladder by a fat meal produced acute pancreatic necrosis in 15

out of 31 experiments. Only 2 of Weiner and Tennant's¹⁰ 38 cases could be explained on the basis of the reflux theory. In 3 other cases in which they found a common channel the pancreas was normal. Inasmuch as the ferments may be activated within the gland, as we have shown experimentally, the theory of Rich and Duff¹¹ that the disease is due to occlusion of the smaller pancreatic ducts by a metaplasia of the duct epithelium is an attractive one. However, in a great majority of cases the pancreas, the seat of acute pancreatic necrosis, fails to show this metaplasia with the resulting occlusion. Nervous and circulatory changes in the pancreas may prove to be most important in the etiology of this disease, but it is futile to speculate concerning them.

CLASSIFICATION OF CASES

The cases of acute pancreatic disease can be divided into three groups: acute pancreatic edema, acute pancreatic necrosis and suppurative pancreatitis. These will now be discussed.

Acute Pancreatic Edema

Since Zoepffel's¹⁸ paper in 1922 this disease has been recognized with increasing frequency. It is probably the commonest form of pancreatic disease, and is often associated with cholelithiasis. In this country excellent studies of this condition have been made by Elman¹⁹ and Cole.²⁰ The latter observed no less than 6 such cases in a series of 8 proved cases of acute pancreatic disease at the Illinois Research and Educational Hospital during a period of eighteen months. The symptoms are similar but of less intensity than those in acute pancreatic necrosis. Shock, according to Cole, is never encountered in this type of the disease. Acute pancreatic edema is frequently seen in association with gall-bladder disease, and the pain and vomiting are usually attributed to the accompanying cholelithiasis. There is a leukocytosis, but it is usually less than that in pancreatic necrosis. A high diastase value in the blood or urine is diagnostic of pancreatic involvement. Swelling and induration of the pancreas may be marked, and may involve either a portion or the whole of the gland. The condition is regarded as the earliest stage of acute pancreatic necrosis, but biopsies reveal only an interstitial edema. There is rarely any free fluid in the peritoneal cavity. There may be fat necrosis as in 2 of Zoepffel's original cases, but if there are areas of necrosis in the gland the condition has passed into the second stage and should be classed as mild acute pancreatic necrosis. Recovery as a rule occurs in a few days.

Acute Pancreatic Necrosis

This has already been described in sufficient detail. The case presented is typical of the disease in its severe form. Some patients die within a few hours, and at autopsy the pancreas may be converted into a hemorrhagic mass. These deaths were formerly attributed to apoplexy of the pancreas. A considerable number of cases were reported with this diagnosis before Fitz²¹ published his epoch-making lectures on acute pancreatitis in 1889. They were really fulminating cases of acute pancreatic necrosis in which the areas of necrosis were overlooked.

Suppurative Pancreatitis

To this group belong also the cases of true gangrene of the pancreas. Both conditions may occur secondary to acute pancreatic necrosis if bacteria lodge and grow in the necrotic tissue. They are rare sequelae. After initial improvement in a case of acute pancreatic necrosis the temperature increases and may be septic in type. The leukocytosis becomes more marked or develops for a second time and usually to a higher degree, the white-cell count sometimes reaching 30,000 or more. Pain and tenderness become localized, usually in the epigastrium or left loin. The physician should be alert to recognize this condition, as incision and drainage constitute the only treatment that will result in cure. If operation is delayed, general sepsis may occur. Suppurative pancreatitis with abscess formation is sometimes seen following the extension of a peptic ulcer into the pancreas, but this is rare. Bernhard²² says that in a series of 200 cases of acute pancreatic disease he saw only 1 of bacterial infection.

LABORATORY AIDS TO DIAGNOSIS

Increased Diastase Values

The most important laboratory aid in the diagnosis of acute pancreatic disease is the determination of the diastase activity of the urine and blood. The test has been applied now in hundreds of cases, and its value in the diagnosis of acute interstitial edema of the pancreas and of acute pancreatic necrosis is undoubted. The method introduced by Wohlgemuth²³ in 1908 and modified by him²⁴ in 1929 is the one most satisfactory for clinical use, because it is so simple that it can be carried out by any intern or laboratory technician. A report can be rendered within an hour of the receipt of the specimen, so that the test may be utilized as an aid in the speedy diagnosis of acute abdominal conditions. More accurate methods of amylase determination are available, but they

are time-consuming and require more equipment and the services of a chemist. As only a great increase in amylase values is of diagnostic significance, the Wohlgemuth method is entirely satisfactory for the purpose.

In 1918 McClure and I⁶ reported 4 cases of acute pancreatic necrosis in which all the diastase values in the urine were normal. We concluded at that time from our own experience and a study of 6 cases previously reported in the literature that the test was of very little value. The cause of our negative results is now clear. All the tests were performed relatively late in the course of the disease, one week or more after the diagnosis was made at operation. About ten years ago the important discovery was made that the diastase value usually falls to normal after the first two or three days. It may be elevated for only the first twenty-four hours. A fresh morning specimen of urine or the twenty-four hour amount should be used for the test. If there is a delay in making the examination the urine should be covered with a layer of toluol. Blood should be collected in a dry test tube and allowed to clot. The serum is used for the test. If diastase determinations of the urine are made daily or every other day valuable information is often obtained. The diastase activity of the urine should be at least 256 units to be of diagnostic value. If it is above this level it is a definite indication of pancreatic disease.

In the case we are studying the urine contained 256 units. Some authorities hold that this is not a sufficiently high value to incriminate the pancreas. It is regarded by all as the lower border of significant value. But note that in the case here reported the examination was not made until at least thirty-six hours after the onset. Fortunately subsequent determinations were made which are most instructive. The following day, the diastase value was at the normal level, only 64 units being present. The course of the curve in the chart certainly suggests that if a diastase determination had been made when the patient was admitted it would have been at a higher level. The rapid fall in diastase furnishes as strong evidence as did the original level of 256 units that the patient had acute pancreatic necrosis. The diastase test is said to be negative even in the first twenty-four hours of the disease in from 10 to 20 per cent of cases. According to Doberer,²⁶ examination of the urine is preferable to that of the blood. In the cases he studied in Clairmont's clinic the blood diastase was normal in the majority of cases, although urinary diastase was almost always increased. Hence other tests are necessary in some cases.

Increase of Lipase in the Blood

In 1932, Cherry and Crandall⁷ demonstrated that a lipase which hydrolyzes olive oil normally not present, appeared in the blood following the ligation of the pancreatic ducts of dogs. The activity of the enzyme, esterase, normally present in the blood as measured by hydrolysis of ethyl butyrate or tributyrin, did not show uniform increase in their experiments. They devised a simple titration method for the determination of lipase in the blood serum, using olive oil as a substrate. Comfort,⁸ using this method, recently obtained elevated values in 20 of 21 cases of acute pancreatic necrosis examined within ten days after the onset of symptoms. The upper limit of lipase activity in persons without pancreatic disease is given by him as about 1.5 cc in terms of N/20 sodium hydroxide per cubic centimeter of serum, although Cherry and Crandall found that the serums of 40 of 46 patients did not reveal any trace of lipase capable of splitting olive oil. In acute pancreatic necrosis a value as high as 10.2 cc. has been obtained. The earlier in the disease the blood was examined, the higher was the value. Fourteen days or more after onset the serum lipase was normal.

Leukocytosis

There is usually a marked increase in the leukocyte count which often exceeds 25,000. It is sometimes as high as 50,000. In a case of acute pancreatic edema in my series, proved by operation, the leukocyte count was 27,000, although the temperature was only 98.6°F. In the present case the leukocytes on admission numbered 18,400. A rapid fall, as occurred during the first week, is a good prognostic sign.

Hyperglycemia

The fasting blood sugar is elevated in 50 per cent or more of cases, hence its importance in diagnosis should be stressed. Brocq and Varangot⁹ found the blood sugar above 150 mg per 100 cc in 57 out of 72 cases and in 34 of these it was above 200 mg. Recently Dunlop and Hunt¹⁰ report that it was elevated in 6 out of 7 cases they studied, and in 5 of these to more than 200 mg. Even when the fasting level is normal a glucose tolerance test may prove of value. Löffler²¹ using Staub's method, demonstrated the value of this procedure. In 5 cases of acute pancreatic necrosis the initial blood sugar was below 140 mg and in 3 of these 110 mg or less. Yet in all 5 cases an abnormal glucose-tolerance test was obtained. In 2 of these the blood sugar level rose above 200 mg in the second or third hour.

Other Aids to Diagnosis

Some writers hold that an increase of urobilinogen is of diagnostic value. Bernhard³² found it increased in 11 out of 12 cases of acute pancreatic necrosis. In the present case there was a progressive rise during the first week, although it was absent at the first examination. Bile in the urine at onset was an aid in the diagnosis. A high serum bilirubin has been observed in some cases. The nonprotein nitrogen may be increased. It was above 40 mg per cent in 14 out of 25 cases studied by Bernhard³². An x-ray film of the abdomen and lower chest may be of diagnostic value. Berg³³ maintains that meteorism of the stomach and transverse colon occurs with great regularity in acute pancreatic necrosis, as well as changes in the lower part of the duodenum. Shadows at the bases of the lungs may be due to pancreatic disease, as Röppa³⁴ has shown.

TREATMENT

The case described in this lecture was one of fulminating acute pancreatic necrosis. Many surgeons would have held that an operation offered the only hope of recovery. Drs. Walker and Nowak thought differently. They did not operate, yet the patient recovered. At the beginning of 1929 all surgical authorities were agreed that early operation was indicated, although early diagnosis and early operation had failed to reduce the high mortality, which remained between 50 and 60 per cent. In that year Pólya³⁵ offered the first protest against this procedure. In 1938 Nordmann,¹⁴ in an excellent paper on the diagnosis and treatment of acute pancreatic necrosis, stated that the death rate among his patients had fallen from 50 to 24 per cent since conservative treatment had been followed. He gave other figures as follows: conservative treatment in Walzel's clinic resulted in a fall in death rate from 86 to 28 per cent, Bernhard's death rate fell to 7 per cent, Demel's fell from 78 to 28 per cent, and Haberer's from 54 to 23 per cent. In a discussion that followed the reading of Nordmann's paper all the surgeons present supported his views. Guleke,³⁶ the well-known authority on pancreatic disease, stated that of his 46 patients on whom operation was performed 12 died, a mortality of 26 per cent, while of 8 conservatively treated patients all recovered. Puhl³⁷ reported that under conservative treatment in the Kiel clinic the mortality fell from 45 to 7 per cent.

Some American statistics likewise show a lower mortality under conservative treatment. The experience at the Boston City Hospital is instructive. There the mortality rate has fallen from 54 per cent in cases submitted to early operation to 25

per cent under conservative measures (Lium³⁸). Dr. Walker³⁰ stated his views in a recent discussion as follows:

One can be sure that most edematous cases of pancreatitis, and some hemorrhagic ones, will recover spontaneously or by medical treatment. Practically it appears that if one suspects acute pancreatitis of low grade, as evidenced by symptoms and clinical findings, surgery is not advisable for the disease per se, but may be indicated on the basis of an accompanying acute lesion of the gall bladder. Likewise, emergency surgery is contraindicated in those cases of hemorrhagic pancreatitis where shock and toxemia are manifest. Under treatment consisting of parenteral fluids and decompression of the upper intestinal tract by the Wangensteen method, some of these cases will recover without surgery, and those in which surgery becomes necessary will be better prepared for it. The treatment of suppurative pancreatitis calls for no special comment, other than that the pancreas should be drained when pus is apparent.

The statistics just cited are additional evidence of the correctness of Dr. Walker's opinion that conservative treatment rather than operative procedures is indicated in dealing with acute pancreatic necrosis. With this view I am in accord. As the disease is not an infection but an intoxication in which trypsin and split-protein products are absorbed by the lymphatics and blood vessels of the pancreas, it would seem evident that this absorption cannot be prevented by any operation, but might on the other hand be increased by incising or even manipulating the pancreas.

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COMPARATIVE STUDY OF THE TUBERCULIN PATCH TEST AND THE STANDARD INTRADERMAL TEST (PURIFIED PROTEIN DERIVATIVE)

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FOLLOWING the introduction of the tuberculin patch test by Vollmer and Goldberger¹ an attempt has been made to compare its value with the standard intradermal test used for several years by the New Hampshire Tuberculosis Association in its case finding surveys. These surveys have consisted in the tuberculin testing of various groups of high-school students throughout the State, followed by an x-ray examination of the lungs of all the positive reactors. The standard intradermal test consists of 0.1 cc. first strength Purified Protein Derivative, which corresponds to 0.1 cc. of a standard Old Tuberculin in the dilution of 1:10,000.

During 1938 we directed these case finding surveys, and the tuberculin patch test was compared with the standard intradermal test in 1455 high school pupils. Most of them were between twelve and sixteen years of age and hence in an age group that was deemed satisfactory for comparative testing. Both tests were made simultaneously on each child—the standard test intradermal on the left forearm and the patch test on the right forearm. Before applying the patch test the skin was cleansed with ether or acetone. In order to obtain their fullest co-operation, the pupils were enlightened in detail at the first session as to the purpose of the tests and the conditions necessary for the most effective results.

The following rules were to be observed

The patch-test area was to be kept absolutely dry.

If any portion of the adhesive became loosened it was to be immediately covered by a fresh piece, as perfect contact between the skin and the patch was desired.

The patch was not to be removed, even temporarily by the subject for any reason without consent of the nurse.

The patch was to be removed by the nurse at the end of forty-eight hours; the test was to be read at that time, and again after another forty-eight hours.

Any reaction at the site of the patch test within one week after the second reading was to be reported.

The majority of the pupils showed a very helpful

TABLE 1 Results of Patch and Intradermal Tuberculin Tests

| LOCATION OF HIGH SCHOOL | NO. OF PUPILS TESTED | NO. OF PUPILS POSITIVE TO BOTH TESTS | NO. OF PUPILS POSITIVE TO INTRADERMAL TEST ALONE | NO. OF PUPILS POSITIVE TO PATCH TEST ALONE | POSITIVE REACTIONS TO ONE OR MORE TESTS | % |
|-------------------------|----------------------|--------------------------------------|--|--|---|------|
| Ashland | 105 | 10 | 0 | 0 | 10 | 9.4 |
| Charlestown | 72 | 13 | 0 | 0 | 13 | 18.0 |
| Claremont | 238 | 52 | 9 | 0 | 61 | 25.6 |
| Eppl & Jeffrey | 81 | 13 | 0 | 0 | 13 | 16.0 |
| Pennock | 122 | 16 | 0 | 0 | 16 | 13.1 |
| Pittsfield | 93 | 10 | 0 | 0 | 10 | 10.7 |
| Lebanon | 116 | 3 | 6 | 0 | 9 | 7.8 |
| West Lebanon | 347 | 44 | 0 | 1 | 45 | 13.0 |
| Lincoln | 79 | 10 | 0 | 1 | 11 | 13.9 |
| Merrimack | 70 | 7 | 0 | 1 | 8 | 11.4 |
| Marbleboro | 117 | 24 | 0 | 0 | 24 | 20.4 |
| Totals | 1455 | 202 | 15 | 3 | 220 | 15.1 |

attitude after having the work explained to them. Table 1 gives the results obtained.

Most of the positive reactions with the patch

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†The patch-testing outfits were supplied through the courtesy of the Lederle Laboratories, Incorporated, Pearl River, New York.

tests were sharply defined. Slight blistering was observed in the more pronounced reactions. It was noteworthy that in a few cases the patch test did not become positive until from five to seven days after the removal of the patch.

In practically all cases the patch-test results ran parallel with those of the intracutaneous test. The poor ones noted in the groups at Claremont and Pittsfield emphasize the importance of mechanical difficulties. Here alcohol was used in cleansing the arm in some instances, and a check-up showed that in nearly every case the adhesive had not stuck properly.

Judging from the results obtained, the patch test would seem to lend itself to large-scale group testing for the following reasons: reliability (it compares favorably with the standard intradermal test), ease of application (it may be applied rapidly even by an unskilled person, and there are no instruments to sterilize), acceptability (the fear of the needle in the minds of both the parents and the child is no small force in holding back a campaign for the skin-testing of large groups), and stability over long periods (since the tuberculin on the patches is in dry form, they may be kept indefinitely). Against the use of the patch test are the obvious mechanical difficulties which are intrinsic in the patch itself or due to lack of co-operation on the part of the subject. The former can be helped by an improvement in the quality of the adhesive plaster used, whereas education as to the value of the test will help to ensure the co-operation and interest of the child.

The patch test offers to the internist and pedi-

atrician a simple, effective and acceptable means for the tuberculin testing of private patients. This fact and the adaptability of the method to group testing should give impetus to the worthy cam-

TABLE 2 *Results of X-Ray Examination of Positive Reactors*

| RESULTS | NO OF CASES |
|---|-------------|
| Adult type pulmonary tuberculosis | 0 |
| Healed tuberculous foci in lungs | 2 |
| Healed calcified tracheobronchial nodes | 31 |
| Soft calcified tracheobronchial nodes | 9 |
| No lesions (healed or active) | 145 |
| Total | 187 |

paign, the eventual goal of which is the tuberculin testing of all citizens of the United States.

It is interesting to note that 187 of the positive reactors received a follow-up x-ray examination of the lungs with the results shown in Table 2.

SUMMARY AND CONCLUSIONS

An attempt has been made to evaluate the use of the tuberculin patch test in comparison with that of the standard intradermal test now used in New Hampshire in tuberculosis case-finding surveys. The results tend to show that the patch test, because of its reliability, ease of application, general acceptability and stability, is equally satisfactory and should prove to be a useful method for case finding, not only in the testing of large groups but also in private practice.

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CAN INFANTILE PARALYSIS BE SPREAD BY BATHING IN SEWAGE POLLUTED WATERS?

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INFANTILE paralysis, otherwise known as acute anterior poliomyelitis, has appeared in epidemic form in the United States at more or less regular intervals during the last thirty years. While epidemics were reported in Europe previous to 1907, this date marks the first serious one in the United States. Because of the nature of the disease and the effect on its victims, great interest has been aroused in its mode of transmission and the methods of controlling its spread.

Epidemiologists agree that infantile paralysis is commonly transmitted by direct contact. There also seems to be evidence that it is sometimes transmitted indirectly through a third person. It is held by some that contact infection is not the only way by which the disease is transmitted. Ever since the outbreak in 1907, each epidemic has suggested new possibilities as to agencies of transmission. Practically every conceivable agent which might carry the disease has been investigated during the last thirty years, but so far the chief value of these investigations has been only to disprove this or that theory.

In 1934 I was engaged to study the problem of sewage disposal at Fall River, Massachusetts. The sewage of that city is discharged without treatment through a number of outfall sewers into the waters of Mount Hope Bay, at the mouth of the Taunton River. During the course of the investigation it was necessary to study the tidal currents in this bay, partly to determine the effect of the discharge of sewage along the waterfront, and partly to aid in selecting a suitable location for an outfall sewer from a proposed sewage treatment plant.

For the most part the waterfront at Fall River is devoted to commercial and industrial uses. At several points along it however there are beaches, two of which are used quite extensively for bathing. While the latter are at some distance from the most important outfall sewers, current observations showed that under certain conditions of wind and tide they were affected by sewage pollution. Many years ago sewage pollution in Mount Hope Bay became so serious that the taking of shellfish was restricted by the state health authorities, and, partly as a result of the Fall River

sewerage investigation in 1934, the restricted area was extended well beyond the former limits.

In the summer of 1935 Massachusetts was visited by an epidemic of infantile paralysis, the incidence of which, according to the Massachusetts Department of Public Health reached the third highest figure in the history of the State. Fall River, with 114 cases reported, had the highest incidence of any city or town. Having but recently observed the effect of sewage upon the bathing beaches at Fall River, I could not but wonder whether this pollution had any effect on the high incidence of infantile paralysis in that city. It has been shown experimentally that the virus of infantile paralysis can gain entrance into the central nervous system through the olfactory nerve endings, and there is considerable evidence that this avenue of infection through the nasal mucosa, is quite common. If it were possible for sewage to carry a sufficient concentration of this virus, what better way would there be of producing a case of infantile paralysis than frequent flushing of the nasal passages with sewage-polluted water, as would be done in bathing, particularly by youngsters with a natural proclivity for diving and swimming under water?

This possibility was also suggested by the fact that the points of highest incidence in Massachusetts in 1935 seemed to be in communities bordering on waters used for bathing and affected by sewage pollution. A large number of cases were reported in the Boston Metropolitan District and in the communities bordering on Salem and Beverly harbors. In each of these districts there are many bathing beaches some of which are known to be affected by sewage pollution. The cities and towns along the Merrimac River reported a high incidence of infantile paralysis in 1935. Sewage pollution along that river has for many years been a serious problem, although bathing in its polluted stretches is not common. The highest concentration of pollution occurs near Haverhill. In this connection a statement in the annual report of the Massachusetts Department of Public Health for 1917 appears to have some significance. In the section of the report concerning acute poliomyelitis in that year the following comment was made: Cases were well distributed except in Haverhill where 38 cases were reported.

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from June to September. The disease has prevailed constantly in Haverhill for the past few years to a greater extent than in some other communities of the same size or larger."

Previous to 1912 it had been demonstrated that the virus of infantile paralysis could be recovered from the mucosa of the intestinal tract and from the feces.¹ Trask, Vignec and Paul² have recently reported on the recovery of the virus from the stools of an infant following an illness from abortive poliomyelitis. Emulsions prepared from the stools on the second, fourteenth and twenty-fifth days following the onset of the disease were used to inoculate monkeys. In each case paralysis developed seven days after inoculation. As evidence of the resistance of the virus, one of the stool samples was kept under refrigeration for ten weeks and the virus remained viable for this length of time. According to the authors, such facts suggest that, during an epidemic, unrecognized forms of the disease may be responsible for a high degree of pollution of sewage with poliomyelitis virus.

Lovett and Richardson³ as far back as 1911 suggested that the disease seemed to prefer river valleys, but concluded that this was probably because of the increased opportunities for personal contact, since highways and railroads frequently follow such valleys. They reported, however, that of 419 cases from 1908 to 1910, 105 cases, or slightly more than 25 per cent, showed a history of swimming, wading or paddling in more or less contaminated water just prior to the attack. However, these authors called attention to 457 cases during the same period, 34 per cent of which showed a history of having been preceded by accidents, overexertion or falls, and concluded that there was at least as much significance in the effect of accidents as in the effect of bathing in contaminated water. If the cases studied by Lovett and Richardson followed the usual age distribution, it is obvious that a relatively large number of children in the first-mentioned 419 cases would have been too young either to bathe or to paddle. Excluding the very young children, the proportion of cases showing a history of bathing in contaminated water would have been substantially greater than 25 per cent. With the evidence gathered by Lovett and Richardson it may seem strange that they gave this factor so little weight, it should be remembered, however, that little was known regarding the disease in 1911 as compared with what is known today. The following statement in their treatise is significant: "There is nothing in the pathologic anatomy and histology of the disease which shows the mode of entrance of the infectious agent into the body nor whether it

reaches the central nervous system by the blood or by the lymph stream."

It is generally held that infection by poliomyelitis is much more widespread than would be indicated by the number of cases diagnosed or identified as such. Children as well as adults may have the disease without having recognizable symptoms. If some of these subjects carry the virus in the intestinal tract for several weeks, which according to the findings of Trask, Vignec and Paul² is possible, the virus must be present in relatively large concentrations in sewage during severe epidemics.

Epidemiologists in their studies of this disease have considered and investigated the possibility of indirect transmission by drinking water, food, rats, insects, birds, domestic animals and air-borne dust particles. While general sanitary conditions in areas affected by the disease have been noted, it would seem that insufficient study has been given to the possibility of infection through bathing in sewage-polluted water.

It is my conviction that there is sufficient presumptive evidence to warrant further investigation and research. The argument may be stated briefly as follows:

Since epidemic infantile paralysis occurs almost invariably during the summer, it is reasonable to assume that the disease may be spread not only by direct or indirect personal contact, but also by some agency which is effective during the warm summer months.

From the evidence in Massachusetts, the incidence of the disease during epidemics is generally highest in communities situated along the seacoast or along rivers the waters of which are subject to sewage pollution.

It has been possible to produce the disease in monkeys from the virus obtained from human stools of a case of abortive poliomyelitis as long as twenty-five days after the onset of the disease. It has also been shown that the virus in refrigerated human stools remains viable for at least ten weeks.

For every recognized case there are apparently many unrecognized cases by which infection may be spread, such cases never having shown any clinical evidence of the disease.

During epidemics, and probably at other times, the virus from active cases or from carriers is undoubtedly present in the sewage of an affected community.

Infection by way of the olfactory nerves is possible, and it appears probable that this is a common way of contracting the disease.

Given a sufficient concentration of the virus in sewage-polluted water, it is conceivable that infection can be caused by the admission of such water into the nasal passages of a bather.

While the possibility of infection by bathing in sewage polluted water has been considered in the past and tentatively dismissed for lack of evidence, sufficient additional knowledge has been accumulated in recent years concerning infantile paralysis to warrant reconsideration of the conclusions reached by previous investigators. It is probably impossible to obtain much help from a study of the records of past epidemics. Epidemiological studies in the past have generally made no special attempt to connect the spread of infantile paralysis to bathing in sewage polluted water. In any future epidemic it would seem advisable that more attention be given to this possibility than has been given in the past. In the meantime some further enlightenment might well be obtained through laboratory research directed toward this specific objective.

It is realized that this theory of transmission of infection has obvious weaknesses. Even though infection can be traced to a bathing-place, is it not possible that contact infection at such places is as instrumental in spreading the disease as is infection by the virus contained in polluted sewage? Can it be that the virus is present in sewage polluted waters in sufficient concentration, even during an epidemic, to cause infection by simply being flushed through the nasal passages? These and similar questions cannot yet be answered. Here is a disease with a seasonal prevalence corresponding to the usual bathing season. In its seasonal prevalence it is more like a disease of intestinal origin than one spread by contact through drop let infection, such as measles, mumps, whoop-

ing cough and similar diseases which commonly occur during cold weather. Numerous attempts have been made to connect the incidence of the disease with some agent or condition which is effective during the summer season. Until the reason for this seasonal occurrence has been discovered, any rational theory of transmission that has not been definitely disproved deserves consideration and study. It is hoped that this brief discussion may suggest appropriate research both in the laboratory and in the field when the next epidemic occurs.

Recent investigations during the summer of 1939 have been reported by Paul Trask and Culotta. At the International Congress of Microbiology Paul⁴ described studies made by him and his associates at Charleston, South Carolina and Detroit, Michigan, on the successful recovery of the virus of poliomyelitis from sewage. A brief report of the work at Charleston has been published by these authors⁵ who conclude: "It is not evident from this work whether the presence of poliomyelitis virus in sewage is a direct or even an indirect link in the chain which leads this infectious agent from one patient to another in this disease. Our report merely calls attention to the fact that poliomyelitis virus may not only be present in urban sewage but also that it may be present in appreciable quantities."

Another recent discovery which may have a bearing on the theory of spread of infection by bathing is reported by Howe and Bodian.⁶ They describe the infection of monkeys following the dropping of the virus of poliomyelitis into the conjunctival sac.

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ALLERGY TO TUBERCLE BACILLI AS A POSSIBLE CAUSE OF ACUTE PULMONIC CONSOLIDATION

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TUBERCULOUS lobar pneumonia is ordinarily thought of as a form of the disease in which the onset is sudden, with consolidation over an area similar in extent to that seen in pneumococcal lobar pneumonia. In the tuberculous form, instead of the consolidated area's resolving as in the pneumococcal disease, the consolidation usually goes on to caseation, the caseous tissue breaks down to form cavities and the course of the disease is rapidly and progressively downhill, death occurring within about six weeks.¹

The case reported herewith is unusual in that while it simulated ordinary lobar pneumonia in most of its clinical features, the presence of tubercle bacilli in the sputum caused a diagnosis of tuberculous lobar pneumonia to be made, yet caseation did not occur and the patient recovered.

CASE REPORT

S U (No U42829), a 28 year old, white married woman, entered the Massachusetts General Hospital on April 27, 1937, complaining of a "cold" which had been present for 1 week. In the past she had had frequent "colds" and for the preceding two winters they had been almost continuous, but they usually consisted only of fullness in the head, with slight nonproductive cough and occasional soreness of the throat. For 3 months before the onset of the present illness the patient had been well. One week before coming to the hospital she had noticed an aching pain in the chest, localized rather vaguely about the upper part of the sternum. Associated with this were a raw sore throat, hoarseness, malaise and chilly sensations. Two days later she began to have a hacking, nonproductive cough, the sore throat subsided but the ache extended to most of the muscles and joints, being most marked diffusely over the chest and about the neck and shoulders. On the night before entry, after going to bed she had a drenching sweat lasting 1 hour and followed by a severe chill lasting 2 hours. There had been no previous occurrence of sweats or chills, no hemoptysis, no weight loss and no known exposure to tuberculosis. The past history was otherwise irrelevant, and the family history was negative.

Physical examination showed a pale, listless young woman. The throat was slightly red, the tonsils had been removed, no enlarged lymph nodes were present. Dullness on percussion was present at the right apex and in the right infraclavicular region, and was associated with an increase in the intensity of the breath sounds, fine rales and egophony, the signs were interpreted as indicating consolidation in the right upper lobe. The physical examination was otherwise negative.

A roentgenogram of the chest on admission showed a

homogeneous area of opacity involving the greater part of the right upper lobe, the lungs were clear elsewhere except for a few calcified nodes at the left hilum. The appearance was that of consolidation consistent with lobar pneumonia.

An attempt was made to type the sputum. This, however, was rather unsatisfactory because practically no sputum could be obtained. The Neufeld method gave negative results for Types 1, 2 and 4. The white cell count was 5700 with 70 per cent polymorphonuclears, 12 per cent large lymphocytes, 8 per cent small lymphocytes and 10 per cent mononuclears. The urine was essentially normal. During the 1st hospital day the temperature rose from 101 to 104°F, the pulse from 90 to 110, and the respirations from 20 to 24. On the 2nd day the temperature, pulse and respirations remained unchanged, and the white-cell count was 7500. Sputum however was more plentiful, about 30 cc. being raised, and numerous acid fast bacilli characteristic of tubercle bacilli were seen in the stained smear. This fact was confirmed by several observers with different preparations of the sputum. On the 4th day, while the temperature, pulse and respirations were unchanged, there was only a trace of sputum and the bacilli were as frequent, only one bacillus was present per five fields. Subsequent progress was satisfactory. The temperature returned to normal by lysis on the 6th and 7th days, with a corresponding drop in the pulse and respirations. No further sputum could be obtained for study, further white-cell counts did not exceed 6000, and the patient's general condition rapidly improved. A few hours before discharge on the 9th hospital day a roentgenogram showed almost complete resolution of the area of consolidation, there remained only a small area of decreased radiance along the right upper border of the mediastinum.

The patient spent the next 2 months at a tuberculosis sanatorium, where her condition was at all times perfectly satisfactory. All roentgenographic examinations made there were negative. A third film of the chest taken at the Massachusetts General Hospital on July 21, 1937, showed no trace of the area of consolidation. At this time the patient had gained 5 pounds in weight and was in excellent health. An x-ray film of the chest taken June 27, 1938, showed the appearance unchanged.

The association of positive sputums with a pulmonary consolidation which rapidly cleared raises the interesting questions: What was the nature of the consolidation, and what was the mechanism of its production?

The low leukocyte count, the failure to identify a causative pneumococcus and the return of the temperature to normal by lysis rather than by crisis show that this was not a case of typical lobar pneumonia. Without the discovery of the tubercle bacilli it might have been regarded as an atypical pneumonia. However, the presence of

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tubercle bacilli is not a matter to be lightly dismissed. It has been suggested that the best explanation of this and the other features of the case is that it was one of tuberculous lobar pneumonia, allergic in nature and non-caseating in its course.

The clinicopathological picture of acute caseous tuberculous pneumonia has been well summed up by Sante.² He points out that the consolidation, instead of clearing up rapidly as in the pneumococcal disease, persists and goes on to caseation and, as a rule, death. He mentions the possibility that the process is allergic in nature. In cases which Fränkel and Troye³ studied they observed the subsequent occurrence of caseation in the area of consolidation and, if the patient lived long enough, cavity formation. It is not generally realized, however, that tuberculous pneumonia may instead be non-caseating. The reason that this is not well known, of course, is the much greater frequency with which caseation instead of resolution occurs as the rule. In fact, one's first thought would be that a tuberculous process of the size present in this case would not clear in a little over a week. Nevertheless, as Wessler and Jaches⁴ have pointed out, the clinical course of tuberculous pneumonia offers many surprises. They state that while the disease is as a rule ultimately, if not immediately, fatal, extensive areas of consolidation may at times resorb rapidly without the development of caseation, and that even in cases in which caseation and cavitation have occurred, recovery may sometimes take place with disappearance of the infiltration and cavities. The virulence of the toxin they consider to be the factor determining the course of events. Their discussion⁵ of the subject is so complete and excellent that it should be read.

Wessler and Jaches attributed the onset of tuberculous pneumonia to overflow from an apical cavity. Such an explanation, however, would hardly be applicable to the case herewith reported. How can we explain the production of tuberculous pneumonia in a patient who presumably has been free from parenchymal involvement up to the time of onset of the pneumonia? Floyd⁶ states that in thoracic tuberculous adenitis when, from caseation and softening, rupture of a lymph node into a bronchus occurs, the material may be expectorated with relief of symptoms or an inhalation tuberculous pneumonia may develop. Lord⁷ likewise attributes the confluent acute or lobar form of tuberculous pneumonia to aspiration of disintegrated tuberculous material from a cavity at the apex or from a caseous node, probably to be ascribed to the effects of the toxins of the tubercle

bacillus on allergic soil. Fränkel and Troye³ were unable as a rule to recover tubercle bacilli from the sputum of patients with tuberculous pneumonia, and considered that the process in its early stages might be regarded as similar to a local tuberculin reaction. Actual allergic reactions of a similar nature have been demonstrated by Fried⁸ in his experimental work with the pneumococcus; he expressed the view that the acute exudate occurring in the lung following the intratracheal injection of heterologous serum depended on a state of local pulmonary allergy. He affirmed the observations of Wadsworth⁹ that in animals partially or incompletely immunized against the pneumococcus a subsequent infection with highly virulent pneumococci injected intratracheally produced a lesion akin to human lobar pneumonia.

On this basis and in view of the sequence of events which occurred in the case herewith reported, it is proposed that the case was one of allergic non-caseating tuberculous lobar pneumonia. It seems reasonable to assume that this patient had been harboring an active tuberculous focus, possibly in the form of one or more infected lymph nodes, and that a state of partial immunization had been produced. One of these nodes may have gone on to caseation with aspiration of some of the infected material into the lung, and so produced an allergic response in the form of the consolidation in the right upper lobe. Of unusual interest is the fact that the process in the lung did not go on to caseation and cavity formation, but instead rapidly resolved, leaving a normal lung and thus simulated an ordinary lobar pneumonia. The rapid recovery may have been due to this patient's having developed a higher degree of immunity than that which had been present in the cases of Fränkel and Troye, in support of this hypothesis is the evidence of the presence of calcified nodes at the left hilum.

SUMMARY

A case is presented in which, although tubercle bacilli were present in the sputum, the clinical course and physical and roentgenological findings were those of an atypical lobar pneumonia of the right upper lobe. It is suggested that in this case a tuberculous lobar pneumonia was produced by the introduction of disintegrated tuberculous material into the lung of an individual who was in a state of partial immunity, and that the resultant consolidation was an allergic response comparable to a local tuberculin reaction. Such a process usually goes on to caseation, cavitation and death; in the case presented there was presumably a high degree of immunity so that rapid

and complete recovery occurred without demonstrable residuum

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REPORT ON MEDICAL PROGRESS

MEDICAL ASPECTS OF OBSTETRICS

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YEARLY progress in the medical aspects of obstetrics is marked by the accumulation of evidence supporting or refuting ideas, claims and theories previously advanced by workers in the field. The discoveries arising from physiological, chemical and biological investigations must be subjected to clinical tests before their general application to clinical problems can be evaluated, hence the work of Taylor and the Smiths must follow that of Zondek and Aschheim, and the work of Colebrook and Long that of Domagk.

The report of progress made last year failed to mention the association of syphilis and the pregnant state, an omission for which I wish to make amends at the present time. It has long been known that a history of syphilis may be difficult if not impossible to obtain, and that the diagnosis of a pre-existing or even of a coincident infection in the pregnant woman may escape the usual clinical examination. It is also a matter of record, from many sources, that prompt and efficient antisyphilitic treatment, especially if applied during the first half of pregnancy, will not only reduce the fetal wastage from miscarriage and intrauterine death practically to the vanishing point, but will also similarly reduce the incidence of congenital syphilis in the newborn infant. The recent reports of Halloran,¹ Hillis and Benensohn² and McCord³ are well worthy of study, as showing that the pregnant syphilitic woman who is promptly treated has at least a 93 per cent chance of bearing a healthy infant.

Since these facts are clear, the attention of the profession and of the public has been intensively directed to the advisability of routine serological examination of every gravida at the time of her first visit to the physician. Seventeen states,⁴ Massachusetts included as of November 1, 1939,

have more or less recently enacted laws requiring routine prenatal blood tests. It is confidently expected that this measure will reduce the incidence of congenital syphilis to a level far below that of the 78 cases reported in this state in 1937 and 1938.⁴

The problems presented by the association of pulmonary tuberculosis and pregnancy differ in considerable degree from those where syphilis is involved. In both conditions, however, early diagnosis of the pathologic state is of the greatest importance. Eisele and Mason⁵ report the discovery of unsuspected pulmonary tuberculosis by stereoscopic roentgenography in 106 per cent of 4040 patients attending the prenatal clinic of the Chicago Lying-In Hospital and routinely fluoroscoped. Since the incidence of unsuspected tuberculosis thus discovered was approximately the same as the incidence (0.87 per cent) of unsuspected syphilis discovered by routine Wassermann and Kahn tests carried out in the same clinic over the same period of time, these writers state that routine roentgenological examinations of the chest should rank with routine serological tests as a medical necessity in pregnant women. Jameson,⁶ however, in commenting upon a proposition that the New York State Department of Health study by x-ray every woman attending antepartum clinics, deprecates the idea on the grounds of the expense involved, even as a research problem, pointing out that the results of a study so conducted would fail to answer the question of the incidence of tuberculosis in pregnancy except as applied to the rather special low income group of patients who would be seen at the state-conducted clinics.

Jameson⁷ reports an investigation of the effects of pulmonary tuberculosis and pregnancy upon each other as observed at the Trudeau Sanatorium. He compares 363 tuberculous women patients be-

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tween the ages of twenty five and thirty five inclusive, who had had no viable pregnancies within six months preceding the development of the disease, with 54 patients of the same age group whose onset of tuberculosis either dated from a pregnancy, developed during a pregnancy or developed within six months of the termination of a full term or viable gestation, and with 34 others who became pregnant while tuberculous. His conclusions indicate that about 12 per cent of the cases showed a possible relation between the onset of the disease and a preceding viable gestation, that symptoms appeared during pregnancy in 35 per cent of the cases and that 4.8 per cent dated from parturition. He found no significant difference in the death rate from tuberculosis in the patients in whom the onset of the disease was related to a full term or viable pregnancy, as compared with a group of nulliparas of the same age group who showed lesions of similar extent.

Both Jameson, and Seeley, Siddall and Balzer,⁷ the latter in a survey of 109 tuberculous gravidas, stress the importance of adequate prenatal treatment of the tuberculosis. Seeley and his co workers pay especial attention to collapse therapy in their article, stating that the results in their series were especially good when there had been treatment for the tuberculosis before pregnancy started, and also when pneumothorax had been instituted during the first trimester.

These findings indicate the trend of results among tuberculous women whose pregnancies are not artificially terminated because of the tuberculosis per se, and re-emphasize the conclusions of Floyd quoted in last year's review.

Pneumonia occurring in pregnancy returns a place of honor among the most dreaded complications. Finland and Dublin⁸ have analyzed a series of 212 cases of typed pneumococcal pneumonia complicating pregnancy and the puerperium, stating that the incidence of pneumococcal types in these cases was similar to that found in all cases of pneumonia in adults. The death rate for each decade was found to be higher for pneumonia complicating pregnancy and the puerperium than for pneumonia irrespective of the pregnant or puerperal state. The death rates were highest for late pregnancy and for women whose pregnancy was terminated during the disease. The mortality however, in serum treated patients was only 20 per cent, as compared with 35 per cent in corresponding non serum treated patients, and the authors, in analyzing the conditions contributing to the failure of serum therapy, predict that early and adequate treatment with the homologous type specific anti pneumococcus serums can be ex-

pected to reduce materially the high death rate from the pneumonias complicating pregnancy.

The foregoing makes encouraging reading, and it is to be hoped that sulfapyridine therapy will be of avail to lessen the mortality rate in pneumonias for which specific antisera are still undiscovered.

The use of sulfanilamide in puerperal and post abortal infections is reported by various authors. Gordon and Rosenthal¹⁰ state that the drug was used in large doses in 118 patients with severe puerperal infections regardless of etiology, with 38 per cent of the results prompt and satisfactory, 38 per cent unconvincing but encouraging, 20 per cent not beneficial and 4 per cent fatal. Morris¹¹ discusses a series of 204 puerperal and postabortal cases of infection, all cultured on admission, of which 97 were treated with sulfanilamide regardless of the organism involved. He found, as one would expect, that cases of infection limited to the uterus, vagina or perineum showed no mortality, that cases involving the pelvic cellular connective tissue, tubes, pelvic peritoneum or veins showed no puerperal mortality but a 12.5 per cent post abortal mortality in the control or untreated group, that 1 of the 2 patients with general peritonitis treated with sulfanilamide died, whereas all 3 patients in the control group died, that 3 patients with postpartum septicemia died whether or not sulfanilamide was used, and that post abortal septicemia showed a mortality of 60 per cent among 5 untreated women, while neither of 2 such patients treated with the drug died.

Much more enlightening are the articles by Chandler and Janeway¹² and by Sadash and Mahan¹³. The former give a complete summary of the use of sulfanilamide in puerperal infections, especially those caused by the hemolytic streptococcus. They discuss the classification of these organisms, the mechanism of invasion and the role played by them in puerperal infections. They call attention to the fact that the Group A strains, which with rare exceptions are always the culprits in human puerperal infection of streptococcal origin are normally present neither in the vagina before or after delivery in the absence of a definite infection, nor in the feces of normal pregnant women, and that puerperal septic infection is chiefly derived from the nasopharynx of contacts. They discuss in detail the method of treatment of streptococcal infections of pregnancy and the puerperium, and outline their recommendations, both for sulfanilamide treatment in the presence of a negative blood culture and for immunotransfusions in cases where the blood culture is positive, or where the clinical response to

sulfanilamide alone is unsatisfactory. Sadusk and Manahan report 2 cases of uterine infection with *Clostridium welchii*, both postabortal, one following packing of the uterus with dry gauze to terminate an early pregnancy, the other subsequent to an unsterile vaginal examination after the onset of bleeding. Both cases had positive blood cultures, but in each case the blood stream was rapidly sterilized and the patient recovered.

It seems to me that barrels of ink have been expended and tons of paper wasted in attempts to derive "results" in the treatment of puerperal infection where the bacteriology has been either unknown or, if known, has been disregarded. The pioneer work of Colebrook and his associates,¹⁴ Lyons,^{15, 16} Keefer¹⁷ and Long, Bliss and Finestone,¹⁸ to name but a few, has been based on knowledge and application of clinical bacteriology and immunology, those sciences the tardy application of which to puerperal infection is bringing forth such encouraging results. Although much remains to be learned, the advances of recent years are bringing us closer than ever before to a rational and effective understanding of the prophylaxis and therapy of puerperal infection.

Epilepsy associated with pregnancy has been discussed by Baptisti,¹⁹ who reports 37 cases of gestation complicated with idiopathic epilepsy. In 21 cases the evidence showed that pregnancy had no effect on the disease, in 5 the condition was improved during pregnancy, in 4 it was made worse, and in 4 it began with pregnancy, 3 cases were unclassifiable. Clinical characteristics of the convulsion per se do not serve to differentiate epilepsy and eclampsia, as the blood pressure may be elevated during an epileptic attack and the convulsion may be followed by albuminuria. The most valuable point is the history of previous seizures, but, as this study indicates, over 10 per cent of epileptic patients have their first convulsion during pregnancy.

The question of therapeutic abortion may be raised in the case of the pregnant epileptic. To do so in the interest of the mother would appear, from Baptisti's figures, to be unjustifiable in 70 per cent of cases. On the other hand, Haupt²⁰ and Hoffmann²¹ call attention to the danger of the occasional development of status epilepticus with its bad prognosis for the patient, and it may be necessary in the case where convulsions are much more frequent during pregnancy to consider abortion. To advise therapeutic interruption for the reason that the infant may inherit the disease is even more debatable. Baptisti quotes Lennox as reporting a heredity incidence of about

10 per cent. The recent work of Lennox, Gibbs and Gibbs,²² reporting the occurrence, by electroencephalographic tracings, of dysrhythmia in at least one parent of 94 per cent of patients with epilepsy, suggests a greater familial predisposition than had previously been suspected. It may be that such determinations will lead in the future to a better rationale for interrupting pregnancy in epileptic patients.

No report of progress in obstetrics would be complete without some reference to the problem of hypertension and albuminuria in pregnancy, commonly known as pre-eclamptic toxemia. Numerous articles appear each year in the literature dealing with the etiology, physiology, pathology, clinical course, classification, sequelae and treatment of this complex syndrome, a few of which will be discussed.

In the matter of etiology the superficial similarity of the toxemias of late pregnancy to essential hypertension on the one hand and to nephritis on the other are matters of common knowledge. Dieckmann, of Chicago, and Reid and Teel, of Boston, have made some progress in differentiating the primary hypertension group and the secondary nephritic or vascular renal group from the welter of so-called toxemics. Dieckmann and Brown²³ maintain that the term "toxemia of pregnancy" should be restricted to those abnormal conditions in pregnancy which are characterized by the occurrence of one or more of the following signs: hypertension, edema, albuminuria, convulsions. The group includes eclampsia, 44 per cent, pre-eclampsia, 47 per cent, vascular renal disease, 36 per cent, essential hypertension, 12 per cent, and acute glomerulonephritis, 05 per cent. Eclampsia and pre-eclampsia are distinct disease entities occurring only in pregnant women.

If these claims are substantiated, the immediate etiology of the toxemias will be found to lie primarily in essential hypertension in about half of all cases, and the ultimate causation in the factors which initiate the hypertensive state. Since Dieckmann believes that hypertension ultimately becomes vascular renal disease, the vast majority of nephritic syndromes, save only those based on glomerulonephritis and pyelonephritis, would appear to have had their inception in arterial disease.

This conclusion still leaves half the field to the conception of a pre-eclamptic-eclamptic syndrome, a theory which the obstetrician is loath to forsake. Peters²⁴ claims that little has been found to support the general impression that toxemias are manifestations of some abnormality of metabolism.

or of disco-ordination of endocrine function. Colvin and Bartholomew,³ on the other hand, claim that a low metabolic rate in early gestation predisposes to the eventual development of toxemia, stating that the blood cholesterol is increased above its normal level in such cases, causing vascular changes in the arteries both of the systemic circulation and of the placenta, and that at the onset of clinical toxemia the basal metabolic rate rises and the blood cholesterol level drops sharply. The development of toxemia they attribute to the trauma of fetal movements, causing rupture of placental vessels at the site of trauma and a resultant infarction, followed by the liberation of guanidine from the infarcted tissues. From the endocrine standpoint, Smith and Smith¹⁴ find excessive amounts of prolactin in the blood in 88 per cent of their toxemic and eclamptic patients, but no corresponding rise of this hormone in cases diagnosed as hypertension or nephritis. Rakoff¹⁷ substantiates this finding, in toxemic patients, but states that the findings were the same in 3 cases of nephritic toxemia. These authors are guarded in the matter of claiming any etiologic cause for toxemia in their observations, while Taylor and Scadron,¹ from similar surveys, conclude that the hormonal changes in toxemia may be simply the result of a disturbance of renal, hepatic or placental physiology.

Strauss¹⁸ is another observer who is skeptical of the existence of "toxemia of pregnancy," claiming that 85 per cent of patients so classified have primary vascular or renal disease. The remaining 15 per cent are due, he believes, to water retention resulting from low plasma proteins, excessive sodium intake or both. While there is no doubt that some cases of toxemia may be explained on this basis, Dieckmann and Brown²² deny that hypoproteinemia is a factor in causing toxemia.

Reid and Teel^{10, 11} have made two valuable contributions to the clinical course and follow up of the various groups of toxemic patients. Among 122 patients with known hypertension prior to and in the first trimester of pregnancy, 105 were carried through to viability; 70 per cent developed albuminuria, but none showed signs of renal insufficiency. 63 per cent suffered from an increase in hypertension during the last trimester. The fetal mortality in the 105 cases was 9.5 per cent. Five maternal deaths occurred in this group, 1 of postpartum amebic dysentery, 1 of eclampsia, the patient refusing adequate supervision and 3 later, of hypertension. The subsequent history of the mothers showed continuance and eventual increase in the hypertension in practically all cases, but a surprisingly small incidence of postpartum albuminuria.

The same authors report a group of 15 patients with known glomerulonephritis occurring one to sixteen years before pregnancy. All showed albuminuria of some degree, with varying numbers of red cells and casts in the sediment from the beginning of pregnancy. Blood pressures ranged from normal to 160 systolic, 110 diastolic. No therapeutic abortions were done. During pregnancy, blood pressure and albuminuria tended to increase moderately, but only 1 case showed sudden weight gain, development of edema and shifts in body water such as occur in simple pre-eclampsia. Fourteen patients delivered live viable babies. Subsequent histories have shown that 4 of the patients are substantially worse than before pregnancy.

Reporting 235 cases of Grade 1 (mild) pre-eclampsia in which the patients were known to have normal blood pressures and urines in early pregnancy, Reid and Teel found no maternal deaths. The fetal mortality was 4.8 per cent, all viable stillbirths. Subsequent histories of the patients showed no impairment of renal function, but 21 per cent had blood pressures of over 150 mm., three times the incidence of hypertension for women of similar age distribution irrespective of pregnancy. Fifty cases classed as Grade 2 (severe) pre-eclampsia yielded no maternal deaths, but had a fetal mortality of 26 per cent. Forty-seven of these cases were followed for six months to two and a half years after delivery, only 1 showing definite hypertension and albuminuria.

In an analysis of 168 patients treated for eclampsia at the Boston Lying-in Hospital from 1915 through 1934 Teel and Reid were able to determine that the maternal mortality was six times as high in women with eclampsia who were known to have had pre-existing hypertension or nephritis as in those known to have been normal before and during early pregnancy. Among 127 patients who had survived eclampsia there were 8 subsequent deaths. 3 had recurrent toxemia (including 2 with recurrent eclampsia), while 3 of the remaining 5 patients had hypertensive disease and 1 may have had nephritis. Eighty patients were subjected to follow up studies. 27 per cent had some degree of hypertension and 9 per cent albuminuria.

The studies outlined in the four preceding paragraphs as well as those reported by Dieckmann and Brown²² and others, bring to our attention the fact that some progress is being made toward classifying the types of hypertensive and albuminuric conditions associated with pregnancy. They indicate that pregnancy may be superimposed upon a pre-existing hypertension, that it may develop a latent hypertension which outlasts the duration of gestation indefinitely, that it may be carried success-

fully to viability in the presence of a pre-existing glomerulonephritis, that pregnancy, especially in the case of excessive multiparity and advancing age, may add appreciably to the damage done to the vascular and renal systems, as well as to the odds against the delivery of a living baby at or near term, and finally that pregnancy, whether or not it is superimposed upon a hypertensive or nephritic background, may be complicated by a syndrome of mysterious origin which for the want of a more specific etiology we must continue to call pre-eclampsia, if unassociated with convulsions, coma or both, or eclampsia, if such association occurs. Stander and Kuder's⁸³ concept of the low-reserve kidney may be construed as mild pre-eclampsia, though the validity of the assumption of renal primacy in this syndrome is in any event debatable. What the nature of the factor is which causes pre-eclampsia or eclampsia to occur in late pregnancy is still beyond our ken, but both the clinical behavior of these conditions and the morbid vascular physiology associated with them render the hypothesis of a circulating factor which acts as a vascular toxin, as emphasized by Page and Ogden,⁸⁴ hard to eliminate completely from consideration.

At all events, an encouraging start has been made. By the combined and co-ordinated efforts of the internist and the obstetrician and of medical and maternity clinics, or by the constant observation and study of obstetric patients before, during and for years after their childbearing careers by the physicians who attend them, we have strong encouragement for the belief that a more rational management of hypertensive and albuminuric pregnancies may be attained, and that prognosis for the life and future health of the mother and infant may be more clearly defined.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26021

PRESENTATION OF CASE

A fifty-six-year-old housewife was admitted to the hospital complaining of pain in the chest of twenty-four hours duration.

The patient stated that she had not been "really well" for ten years before admission. She had experienced vague, transient abdominal and joint pains, had felt weak and had noted nocturia one to three times. She, however, was able to perform her housework until eight months before admission when she developed a severe cold that left her debilitated, anorectic and listless. She began to notice nervousness, dizziness, throbbing headaches and blurring of vision. These complaints increased in severity until four months before admission when she entered the Out Patient Department. The physical examination revealed a well-developed and nourished woman in no acute distress. The fundi showed narrow, tortuous, silvery arteries, with marked changes in caliber. There were small areas of white exudate in the macular regions of both eyes. She was edentulous. The heart was enlarged to the left and downward, with the apex 11.5 cm from the mid-sternum. A soft systolic murmur was heard over the apex, with the aortic second sound louder than the pulmonic. The rhythm was regular, the sounds of good quality, and the blood pressure 254 systolic, 134 diastolic. The lungs, abdomen and remainder of the examination were negative. The blood examination showed a red-cell count of 4,900,000 with 80 per cent hemoglobin, and a white-cell count of 12,000 with 74 per cent polymorphonuclears. The urine showed a specific gravity of 1.020, a +++ albumin test and an abundant growth of *Bacillus coli* in the catheterized specimen, there were occasional granular and hyaline casts. A flat abdominal film showed a small right kidney and a large left kidney shadow. There were degenerative changes of the lumbar spine and evidence of arteriosclerosis. A soft tissue mass in the true pelvis was thought to be an enlarged uterus. There was fairly prompt excretion of dye on the right side, the kidney pelvis were normal in size and shape, and the ureters were incompletely demonstrated. The patient was treated symptomatically, but her

complaints progressed. One month before admission to the hospital daily vomiting began, and persisted. Her vision failed, and she became dyspneic, and orthopneic, but noticed no edema. She felt very drowsy but, at the same time, restless and was unable to sleep. One week before entry she noted that her urinary output had become scanty. One day before admission the abrupt onset of a severe substernal and mid-epigastric pain appeared, there was no radiation to the neck, jaw or arm. The pain was so agonizing that it caused her to "double up," and she felt choked and as though she could not breathe. The pain kept her awake all night, but diminished somewhat on the morning of admission. There was an associated severe headache. She had lost 30 pounds during the eight months before admission. The remaining past, family and marital histories were noncontributory.

The physical examination revealed a tall, well-developed woman with loose skin and evidence of recent weight loss. She was listless and responded poorly. The breath was urinous. The fundi showed areas of exudate, silver wire arteries with marked changes in caliber, and blurred optic disks with loss of physiologic cupping. The heart was enlarged to the left and downward, with a systolic murmur over the precordium. There was also a harsh scratching sound heard in systole over the pulmonic area and along the left border of the sternum. The blood pressure was 240 systolic, 140 diastolic. The radial and brachial arteries were extremely hard. By vaginal examination the fundus of the uterus seemed to be about twice its normal size, but was firm and freely movable, the cervix was normal.

The temperature was 99°F., the pulse 90 and the respirations 22.

Examination of the blood showed a red-cell count of 3,100,000 with 69 per cent hemoglobin and a white-cell count of 15,300 with 94 per cent polymorphonuclears. The urine showed a constant ++++ albumin test, with the sediment containing innumerable white cells. A urine concentration test demonstrated a maximum specific gravity of 1.014. A culture of a catheterized specimen showed no growth. The serum nonprotein nitrogen was 130 mg per 100 cc. The serum calcium was 7.7 mg per 100 cc., and the phosphorus 14.0 mg. A lumbar puncture was normal except for a ++ ammonium sulfate flocculation test and a total protein of 63 mg per 100 cc. An electrocardiogram taken one day after admission showed a low T₁, a diphasic T and an inverted T₃ with Q₃ small, ST₁ and ST₂ slightly depressed and slight slurring of QRS. A retrograde pyelogram

on the left showed the tip of the catheter at the level of the upper margin of the sacrum, the kidney pelvis was moderately dilated, the calyces were irregularly outlined, and the ureter was not dilated. The patient ran a slow, steadily downhill course. A few hours after admission she became more restless, and dyspneic. She became cold and gray, and was sweating. The pericardial friction rub disappeared, and the pulmonary second sound became louder than the aortic. The right lung filled with fine crackling inspiratory rales, and a gallop rhythm appeared at the apex. The blood pressure remained at 280 systolic, 140 diastolic. She became irrational, stuporous and finally, after a few days, comatose. Her serum nonprotein nitrogen rose to 205 mg per cent. The temperature gradually rose to 100, then to 103°F, where it remained for three days until she died on the tenth hospital day. The pulse varied between 80 and 100, and the respirations from 12 to 25. A few hours before death she developed a confluent erythematous eruption over the entire body.

DIFFERENTIAL DIAGNOSIS

DR WILLIAM B BREED This on the surface seems to be a perfectly orthodox case. It is that of a fifty-six-year-old woman with ten years of disability and increasing symptoms which suggest arteriosclerosis, hypertension and nephritis. Through the period of the visits to the Out Patient Department there seems to be very little to comment on except the question of the condition of the left kidney, which is not clearly described. In the Out Patient Department the urine at first showed an abundant growth of colon bacilli but no pus, later on, much pus and a sterile culture. She had no substernal or epigastric pain until just before she came into the hospital, so that we do not have to consider anything else but progressive arteriosclerosis with hypertension and nephritis, except possibly the question as to what part one kidney played in the production of hypertension. The report on the intravenous pyelogram is not at all conclusive, and I should like a little more information on that.

DR GEORGE W HOLMES We have here only the films of the retrograde pyelogram, those of the previous intravenous pyelogram are missing. The report of the latter speaks of a large left kidney and a small right one, it mentions fairly prompt excretion of the dye by the right kidney and implies but does not actually state that excretion was delayed on the left. They did not describe any abnormality of either pelvis but nevertheless interpreted the findings as suggestive of

left hydronephrosis. I should not care to accept such an opinion without reviewing the films myself.

These are the films of the retrograde pyelogram. We have no films that are free from motion, and I imagine that they were taken with low-amperage apparatus. The left kidney is a little larger than the right. The right is small, and the left about normal in size. I should not interpret this pyelogram as being abnormal. The left pelvis does look large, but if the man who injected it used a little more pressure than usual he could make a normal kidney pelvis look as large as that and assume that shape. Whatever change you have there might be due merely to spasm from overinjection. The kidneys may be diseased, but I am not willing to make a diagnosis of anything in particular from the evidence.

DR WILLIAM B BREED She may have had infection in both kidneys or only in one. While in the hospital the fever was indicative of a generalized infection. Up to the day before entry this is a perfectly straightforward story of increasing renal failure and hypertension. The episode which occurred on that day could have been due to one of three important things: coronary occlusion, pericarditis or pulmonary embolus. We do not need to consider anything but pericarditis if we are going to be consistent. The pain is perfectly admissible. She did not have shock, she had no fall in blood pressure. At that time there was a systolic friction rub over the pulmonary area and along the left sternal border, but no evidence of a large pulmonary embolus or of a coronary episode.

Before this exercise, I took the occasion to talk with Dr Bland about the electrocardiogram, without telling him the story, because I was confused about it. I think it would be fair to ask him now, knowing the story, to comment further. She had had no digitalis to produce the changes. She did have uremia, which might explain them. The only thing that was odd about it was the absence of left-axis deviation, in the face of a large left ventricle.

DR EDWARD F BLAND This tracing is well described in the record. It is abnormal but without a very characteristic configuration. ST₁ and ST₂ are definitely low and diphasic. T₁ is a little inverted. The QRS complexes are just a little slurred but within the accepted normal. The chest lead is normal. The PR interval is at the upper limit of normal, 0.2 sec, which was not mentioned in the record. With these changes one would suspect that digitalis was responsible, but the patient is said to have had none. These

changes in the ST waves in all three leads make one wonder a little about pericarditis. Uremia also will change the T waves, as well as other severely toxic states. If this patient had a big heart secondary to hypertension, it is a little unusual not to have had a little more indication of left axis deviation, but I do not believe we had better put too much weight on that.

DR. BREED: Would the presence of pericarditis or pulmonary infarct destroy the evidence of left axis deviation that might have been there?

DR. BLAND: If there had been left axis deviation due to hypertension, it would have taken a considerable amount of dilatation of the right side of the heart to balance it in a normal direction. We sometimes see such a condition in young people with severe rheumatic fever who get acute dilatation of the heart. One also has to consider that there may have been very clear changes due to coronary disease before the last episode, which may in turn have masked them.

DR. PAUL D. WHITE: I should consider this an abnormal record. Dr. Breed will remember a patient whose record improved in appearance a good deal while coronary disease actually increased, due to a compensating lesion in a different part of the heart. With an old apical infarct the T waves in Lead I were inverted, but a fresh, basal infarct made them upright again and so look better. Actually the patient was sicker as a result of the new lesion.

DR. JOHN H. TALBOTT: Is it clear that the patient had not had digitalis before the electrocardiogram was taken?

DR. TRACY B. MALLORY: On the day before at three in the afternoon, the patient had been given 9 gr. Some time earlier, while being followed in the Out Patient Department, she had been given digitalis, but she had not taken any for several months.

DR. BREED: In any case, digitalis may have had an effect on the tracing. The electrocardiogram does not give us much help in determining what was going on here except, I think, in ruling out coronary occlusion.

I shall comment a minute on the blood chemical findings. At first glance the figures suggest hyperparathyroidism, but the phosphorus is a good deal higher in proportion to the depression of the calcium than one finds in that condition. I think these figures merely represent a very severe acidosis, which is always present with this degree of uremia.

If I am right, the first episode of pain before she came in, is to be accounted for by pericarditis associated with uremia. The pulmonary

second sound became much louder than the aortic, a change which suggests that in addition to uremia and pericarditis there may have been pulmonary infarction toward the end. Of course, this change in the pulmonary second sound is very striking, if the record is true, and I think it is worth taking seriously. At about the same time they found crackling inspiratory rales, and a gallop rhythm in the heart. There is no note of distended neck veins. If she had had distended neck veins it would make it a little easier to conclude that there was pulmonary infarction. I am rather inclined to think that this last episode of pain is different from the one she had before she came in, and that it was perhaps due to pulmonary infarction. We know she had infection in the genitourinary tract, which involved one or both kidneys. She had been sick a good while, and there is every reason to expect that she might have had an embolus, septic or not.

So to summarize, she had arteriosclerosis and uremia, the latter probably on an arteriosclerotic hypertensive basis. Not being able to accuse one particular kidney I cannot include it as a cause of the hypertension although there might perfectly well have been a contributory infection in the kidney. As a terminal event pericarditis supervened. I suspect that in addition there may have been terminal pulmonary infarction.

DR. WHITE: I should like to comment on the scratchy sound in systole over the pulmonary area that disappeared. We have observed it a number of times in cases without pericarditis but with acute pulmonary embolism and resulting dilatation of the pulmonary artery. I think it might be explained on that basis in this case. In other words, the first attack might have been due to pulmonary embolism rather than pericarditis and another attack occurred later.

DR. BREED: Apparently the friction rub lasted ten days or more. She was in the hospital for ten days, and it only disappeared the day before she died. One would not expect a pulmonary infarct to remain constant for ten days.

DR. WHITE: True, but there may be prolonged dilatation of the pulmonary artery, as in cases of thyrotoxicosis. I have not known of its persistence for as long as ten days in pulmonary embolism, however.

DR. TALBOTT: I saw the patient only a couple of days before she died. The pericardial friction rub had disappeared.

DR. WHITE: So it may have been brief.

DR. BREED: It could have been due to pericarditis and still have disappeared.

DR. WHITE: I was trying to help you out with

one diagnosis so you would not have to make two

DR BREED Then you would like to exclude pericarditis, if possible?

DR WHITE Yes The pericardial friction rub in uremia is near the apex and the lower end of the sternum rather than over the pulmonic valve area

DR BLAND Might I ask about pain associated with pericarditis Is it usually as agonizing and severe as it apparently was here? My impression is that most people with pericarditis have no severe pain

DR BREED I should agree, but it may be very severe

DR WHITE The pericarditis of uremia is painless, is it not?

DR BREED Not always

DR MALLORY A significant number of patients with pericarditis reach the operating table and have their gall bladders or stomachs explored

DR CHARLES L SHORT That point came up before at one of these conferences It was said that many of these patients were stuporous and did not notice the pain, but that in conscious patients it was a common finding

DR BREED May I ask whether this electrocardiogram rules out a pulmonary embolism in the first episode?

DR BLAND There are no characteristic changes of acute pulmonary embolism in the record

DR WHITE It may be too late for them The record was taken twenty-four hours after the attack The electrocardiographic evidence in the acute cor pulmonale may last only a few hours

CLINICAL DIAGNOSES

Uremia
Vascular nephritis
Coronary occlusion?

DR BREED'S DIAGNOSES

Arteriosclerosis
Arteriosclerotic and hypertensive heart disease
Acute pericarditis
Vascular nephritis (uremia)
Pulmonary emboli?

ANATOMICAL DIAGNOSES

Vascular nephritis, chronic
(Uremia)
Pericarditis, fibrinous, acute
Cardiac hypertrophy, hypertensive type
Arteriosclerosis of coronaries, aorta and renal vessels
Hydronephrosis, left, slight
Leiomyomas of uterus
Cystitis

PATHOLOGICAL DISCUSSION

DR MALLORY Cases of this sort are difficult to interpret in life and equally difficult to interpret after postmortem examination This patient did have a pericarditis, an acute fibrinous one, and did not have any pulmonary emboli So I think we have to assume that the rub and pain were both due to pericarditis She had a moderate amount of coronary sclerosis but no occlusion and no areas of infarction The heart was considerably hypertrophied, weighing 600 gm, and the hypertrophy was predominantly left ventricular So it seems she would have had a left-axis deviation

The kidneys are rather more difficult to interpret They were a little small—one weighed 120 gm, the other 135 gm The pelvis of the left kidney seemed to us very slightly dilated, and the calyces very slightly blunted On the right the pelvis was even more questionable, we were not sure whether it was dilated The renal arteries on both sides showed rather marked atheromatosis, and on the left, one of the atheromatous plaques seemed definitely to obstruct the lumen of the artery Both kidneys showed adherent capsules and granular surfaces, and on microscopic examination, an extremely severe grade of vascular nephritis Whether or not they show minimal evidence of inactive and healed pyelonephritis, I would not dare to say I can see nothing that strikes me as convincing evidence of such a diagnosis, although I think it is the type of lesion that might be interpreted as such

DR WHITE Was the pericarditis fibrinous and not purulent?

DR MALLORY It was fibrinous

DR HOLMES Was there any disease of the mucous membrane of the pelvis of the kidney?

DR MALLORY No

DR WHITE An important lesson from this case is the correction of the current impression, which had been my own also, that the pericarditis of uremia is painless Terminal heart failure may explain the late signs which simulated a final pulmonary embolism

CASE 26022

PRESENTATION OF CASE

A sixty-three-year-old Italian candy maker was admitted complaining of difficulty in eating solid food

Four years before entry the patient had retired from active business but felt quite well at that time For the next two years his health remained good, but thereafter he gradually developed ma

laise and progressive weakness. There was slight increasing dyspnea with exertion but no cough or expectoration. For about eight months prior to admission he had swelling of the ankles developing in the afternoon and subsiding during the night. There was no associated pain or intermittent claudication. Four months before entry he began to have nocturia of four or five times, with a diurnal frequency of five or six times. There was some dysuria, but the urinary symptoms were improved following medication two weeks before admission. Two months before entry he began to have difficulty in swallowing. There was some question in the recorder's mind as to whether this was obstruction or merely an extreme anorexia. The patient stated that he would take a mouthful of food and then expectorate it. He was able, however, to ingest liquids without difficulty. There was some gaseous eructation but no nausea or vomiting. During the four months before coming to the hospital he was slightly constipated and took a laxative every other day. This produced two bowel movements daily, which were not watery and did not contain blood. The stools were rather light colored, but there was never any jaundice. Two months before entry he first noted that his abdomen was larger than usual. There was no pain except for occasional lower abdominal cramps associated with bowel movements. A week before entry he began to cough up small amounts of mucoid material. Occasionally a little blood was expectorated in the morning. The cough often awakened him at night and he had difficulty in getting his breath until he raised some of the mucoid material. At no time was the patient confined to bed. His weight five years previously was 188 pounds, and on entry 176 pounds.

Physical examination showed a well nourished florid man who coughed frequently. There were numerous telangiectases on the face, the skin, nailbeds and mucous membranes were hyperemic. Oral hygiene was poor, and the tongue was dry and furred. Percussion of the chest showed that the diaphragm was higher than normal, with the left leaf higher than the right. There was dullness at both apices posteriorly, and inconstant rales were audible at the right apex, no other pulmonary signs were noted. The heart was slightly enlarged to the left, and the sounds were distant in character; no murmurs were heard. The abdomen was protuberant, and there was a reddish-blue, reducible, umbilical hernia. A fluid wave was elicited and there was shifting dullness in the flanks. The liver and spleen were not palpable, but there was tenderness in the right upper quadrant. The left testicle was small, and the scrotum over its posterior surface pre-

sented a rough hard area. There were numerous varicosities of the lower extremities, and pitting edema up to the hips.

The temperature was 99.8°F, the pulse 100, and the respirations 25.

Examination of the urine showed a specific gravity of 1.032, with a slight trace of albumin and a green precipitate with the Benedict test. The blood showed a red-cell count of 4,600,000 with a hemoglobin of 90 per cent, and a white-cell count of 7590 with 81 per cent polymorphonuclears. Several sputum specimens contained blood but were negative for tubercle bacilli. Three stool specimens gave negative reactions to the guaiac test. A blood Hinton test was negative. The icteric index was 5, and the van den Bergh test gave a direct reaction. A liver function test showed 40 per cent retention of dye, and the Takata Ara reaction was strongly positive. A tuberculin test was negative.

X-ray examination showed a diaphragm with limited motion. There were increased markings in the medial portions of both lower lung fields and a hazy, partially calcified dullness in the lateral portion of the first right intercostal space. The heart was not enlarged, but the left ventricle appeared to be hypertrophied. The aorta was tortuous and slightly widened, and showed marked calcification. There was no evidence of esophageal varices, but the lower end of the esophagus was dilated and there was a small hiatus hernia.

On the second hospital day 3500 cc. of slightly cloudy, pale yellow fluid was removed by abdominal paracentesis; this formed a pellicle on standing. The specific gravity was 1.005, there were 300 white blood cells per cubic millimeter, of which 75 per cent were lymphocytes and 25 per cent polymorphonuclears. The patient continued to run a fever up to 100°F and on the fourth hospital day expectorated about half a cupful of reddish-brown sputum. Six days later the temperature rose sharply to 103°F, and the respirations to 45. There was dullness at the right base. The breath sounds were diminished, and a few crackling rales were heard. Later the dullness became increased and bronchial breathing was heard in the same region. His temperature remained elevated, and the chest signs persisted. His condition became progressively worse, and he died on the thirteenth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. ALFRED O. LUDWIG. The differential diagnosis in this case presents considerable difficulty because of the fact that his symptoms are referable to several systems. The most important features in this history seem to me to be the increas-

ing dysphagia, the dyspnea, the cough and later hemoptysis, the malaise and weight loss, the abdominal symptoms, the increase in size of the abdomen, the cramps and constipation, and finally the increasing edema of the lower extremities.

The record tells us that this man had not lost much weight. The telangiectases mentioned are not unusual in older individuals, but are thought by some to be indicative of liver disease. The examination of the lungs indicates that both leaves of his diaphragm were high, and further information makes it likely that they were elevated by the presence of fluid in the abdominal cavity. I am inclined to discount the lung findings mentioned at this point. Along with everything else, the presence of an umbilical hernia is confirmatory evidence that there was an increase in intra-abdominal pressure, in this case due to fluid. I do not know how to interpret the findings in the testicle and scrotum. The edema of the lower extremities was probably due to the same cause as was the ascites.

The laboratory examination proved that this individual did not have any marked degree of renal disease, as he was able to concentrate up to a specific gravity of 1.032. This is unusually high and may be partially explained on the basis of glycosuria, although he may have been somewhat dehydrated at the time this specimen was collected, or was unable to excrete water normally because of the edema. The examination of the blood was normal, but the presence of blood in the sputum draws our attention back to the lungs, and it is difficult to escape the idea that there must have been some lesion there to explain this finding. The absence of occult blood in the stool is a bit of evidence against a lesion which would cause bleeding into the gastrointestinal tract, such as cancer of the stomach or bowel, and also against varices in the esophagus, at least against bleeding varices. The icteric index and van den Bergh tell us that there was a disturbance of the liver, and as we know that there was bile in the stools, the bilirubinemia could not have been due to an obstruction of the bile passages but must have been secondary to disease within the liver. This is further substantiated by the fact that he had a markedly impaired liver function, as evidenced by the retention of 40 per cent of the dye and also by the strongly positive Takata-Ara test. This is good evidence of severe liver damage, although it does not tell us anything about its cause.

The x-ray films of the lungs are consistent with the presence of an old tuberculosis, but I cannot tell from them whether there was active tuberculosis at the time of his entry. The findings in

the heart and aorta I interpret as consistent with his age. I should like to know more about the dilatation of the lower end of the esophagus. One wonders, for instance, if there might have been some cause for obstruction below. Certainly the record should so state, if there was any evidence of esophageal tumor. A hiatus hernia is not uncommonly present, and I do not believe that it contributes to his symptoms.

The findings in the ascitic fluid are those of a transudate, but I do not believe that ordinary transudates, such as one would expect to find in uncomplicated hepatic cirrhosis, usually contain so many white blood cells, and their presence suggests a complicating low-grade peritonitis, which is not uncommon in the presence of cirrhosis of the liver.

The terminal course of this patient again leads us back to the lungs. The description is that of a pneumonic consolidation at the right base, and this condition seems to have led to his death.

Is it possible to tie up all these findings and to explain the course of the disease on the basis of one diagnosis? I do not believe that it is. In the presence of marked impairment of liver function, jaundice and edema, I do not see how one can escape the diagnosis of cirrhosis of the liver. We do not know if he had an alcoholic history, but that is not necessary for the development of cirrhosis. However, such a diagnosis cannot explain the hemoptysis, cough and dyspnea, and terminal lung findings, and we must conclude that the dullness and rales heard at the apices at the time of admission are more important than I was at first inclined to believe. These, plus the x-ray findings, as well as the persistent hemoptysis, strongly suggest the presence of pulmonary tuberculosis. If this is true, then even the terminal event could be explained on the same basis, namely, a tuberculous pneumonia, arising by a sudden massive bronchial spread. The presence of the white cells in the peritoneal fluid might be interpreted as evidence of a low-grade tuberculous peritonitis, although there is nothing else to suggest it, and implies that he had a miliary spread at the end. This is possible, but we have no way to be certain. The negative tuberculin test is against the diagnosis, but may occur occasionally in the presence of miliary tuberculosis.

Is there any other way in which we can explain his symptoms? I suppose that one should consider tumor of the lung. Metastatic carcinoma does not usually invade bronchi and therefore does not cause hemoptysis. It would seem to me to be very unlikely that this man had a large primary bronchial carcinoma without there being

more evidence of it on physical or x-ray examination

Could he have had tumor elsewhere? If present, it must have invaded the liver to the extent that it caused marked impairment of function, and in that case it would seem likely that the liver would have been enlarged and that metastatic masses would have been palpable. It is possible of course that he may have had a primary hepatoma arising on a cirrhotic liver, a favorable condition for such an event. I do not believe that we have enough evidence for this diagnosis. Should one consider that tumor may have arisen from the testicle? If it is of any importance at all, I think it is more likely that the mass felt there was tuberculous, and part of a general tuberculosis. How about the terminal dysphagia? It may have been a part of his cirrhotic symptom complex but I do not recall having seen such marked dysphagia from that cause alone. As no intrinsic cause was demonstrated, and there does not seem to have been a paralysis of the pharyngeal muscles, one must consider an extrinsic cause for this symptom. Possibly there were lymph nodes which were causing pressure on the esophagus. If so they should have been demonstrated by x-ray. I do not believe that this is an entirely satisfactory explanation. In the absence of a blood-sugar determination it is not possible to say whether the glycosuria was due to diabetes mellitus or related to the liver disease. It was more likely due to the latter. There was no evidence of renal tuberculosis.

It is possible that the liver impairment was tuberculous in origin, either due to large tuberculous foci in the liver or to miliary tuberculosis. If he had miliary tuberculosis, it must have been of very recent origin, as his whole story is much more that of slowly developing symptoms secondary to hepatic cirrhosis, with perhaps a terminal lighting up of an old tuberculous process in the lung.

CLINICAL DIAGNOSES

Cirrhosis of liver
Bronchopneumonia
Ascites
Malignancy of lung?
Tuberculosis of lung?

DR LUDWIG'S DIAGNOSES

Portal cirrhosis of liver
Ascites and peripheral edema
Pulmonary tuberculosis (apical and tuberculous bronchopneumonia)
Tuberculous peritonitis?
Miliary tuberculosis?

ANATOMICAL DIAGNOSES

Cirrhosis of liver, alcoholic.
Ascites
Lobar pneumonia
Pulmonary tuberculosis, healed
Peritonitis, chronic aseptic
Nephritis, chronic vascular, slight.

PATHOLOGICAL DISCUSSION

DR TRACY B. MALLORY The clinicians on the ward who were in charge of this patient reached essentially the same conclusion as that of Dr Ludwig. The primary condition was obviously cirrhosis of the liver. The organ was moderately hypertrophied weighing 1950 gm. Its surface was definitely granular, with fairly uniform nodules measuring from 1 to 4 mm in diameter. It was markedly firm and cut with considerable difficulty, thus indicating extensive fibrosis. On microscopic examination it was entirely consistent with an alcoholic cirrhosis, and the lack of a definite history may well have been due to the language difficulty and the necessity of taking his story through an interpreter. Considering the severe degree of the cirrhosis, it was surprising that the spleen was not enlarged. It weighed only 160 gm and did not show any significant degree of the fibrotic change which is usual in cases of portal obstruction. The esophagus also showed little abnormality, although the prosector thought there was a slight dilatation of some of the mucosal veins; certainly there were no definite varices. In the clinical examination it was noted that the veins of the anterior abdominal wall were unusually prominent, and it is possible that most of the collateral circulation had developed in this direction rather than through the splenic vein and the esophageal vessels. His omentum was very densely adherent in both flanks and beneath the old herniorrhaphy wound which may well have permitted an extensive collateral circulation to have developed. We found nothing which would explain the dysphagia. An old apical tuberculous process was present, but there was no definite evidence of activity. The terminal event was a lobar pneumonia in the right middle and lower lobes. The heart was not hypertrophied, and the coronaries showed moderate atherosclerosis but no significant narrowing of their lumens. The kidneys showed a moderate grade of vascular nephritis, and unfortunately, we did not explore the testicle. The peritoneal fluid was very faintly turbid, and the peritoneal surfaces tended to be slightly granular, nothing was found, however, to suggest a true infectious peritonitis.

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THE TUBERCULIN PATCH TEST

IN 1937 Vollmer and Goldberger¹ described a tuberculin patch test for children and found it simple, harmless and reliably approximating the accuracy of the Pirquet test. The material for this Vollmer patch test consists of a wide strip of adhesive tape on which have been placed two small squares of filter paper previously saturated with Old Tuberculin, with a control square saturated with glycerin broth between them. The tape with its dried squares is firmly applied to the skin, previously cleansed with ether, benzol or acetone. Natural moisture of the skin (insensible perspiration) liquefies the tuberculin concentrate, which can then be absorbed by the skin, producing a tuberculin reaction. The tape with its squares is

removed forty-eight hours later, and the test is read forty-eight hours after removal. A few tests may not become positive until the third or fourth day.

Vollmer and Goldberger² carried out a comparative study of the patch test and the Mantoux test in 678 children. Their results showed 100 per cent conformity of the patch test with the Mantoux test using 0.1 mg. of Old Tuberculin or the first test solution of Purified Protein Derivative. Hart³ in England found similar results in comparative studies on 536 children, but the patch test gave fewer positive reactions than did strong dilutions (10 mg.) of Old Tuberculin. Wolff and Hurwitz⁴ tested 964 children under sixteen years of age. They found no discrepancy between the patch test and Mantoux test in cases with active tuberculosis, but one of 18 per cent in the series as a whole. Another comparative study on children twelve to sixteen years of age is reported in this issue of the *Journal*.

Experience is thus accumulating to show that the tuberculin patch test is a new and important addition to our armamentarium in the early diagnosis of tuberculosis. It is a test that is simple and painless to carry out, and one that requires no instruments to perform. Severe local and constitutional reactions have not been reported, and there is no danger of infection. There is little objection to its use, and it is a test that should prove of value to the practitioner in the use of tuberculin for the discovery of contact cases of tuberculosis. The difficulties that are entailed in the preparations for a Mantoux test and the ever-present fear of the "needle" by both parents and children too often lead to its omission as a diagnostic procedure.

The conformity of the tuberculin patch test to the Mantoux test using 0.1 mg. of Old Tuberculin or the first test solution of Purified Protein Derivative has been well established in children, but comparative studies in adults are lacking. Until more widespread investigations have been carried out it is probably still necessary, as recommended by Vollmer and Goldberger,² to retest those negative to the patch test with 10 mg. of Old Tuberculin.

culin or the second test solution of Purified Protein Derivative. Where there is any doubt regarding the presence of tuberculous infection the Mantoux reaction remains the final and decided test.

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INDUSTRY AND SYPHILIS

In the present campaign against syphilis attention should be called to the important relation of industry, as represented by employers, to syphilis. Syphilis produces incapacity in workers in two stages first, in the early stage when it is communicable, and, secondly, in the late stage when manifestations of the disease produce a lowered earning capacity. If early syphilis is adequately treated the contagiousness quickly disappears and the individual can return to work with an excellent chance of continuing an undiminished earning capacity. If employers see to it that such a worker continues his treatment and keep him on the job, they can retain such people as valued workers and aid in preventing the later disabling consequences which may result in the worker's becoming a public charge because of cardiovascular or cerebrospinal complications. Surveys have shown that in patients observed over a ten or twenty year period no cases of syphilitic heart disease developed among those who had received proper treatment in the early stages, while 34 per cent of those having no treatment developed cardiac manifestations. Furthermore, in these series only 1.6 per cent of the properly treated patients showed central nervous-system disease, while in the untreated cases 17 per cent of the patients developed syphilis of the central nervous system. All in all, it has been found that adequate treatment early in the disease will prevent the manifestations of late syphilis in more than 80 per cent of all cases.

In the majority of cases discovered at present

the patients are found to have the latent and asymptomatic type of syphilis, and the late complications may also be prevented in these cases by adequate treatment. Some industries have already established clinics for the treatment of infected employees and their families and are requiring routine serological examinations. These employers are not discharging such employees. They require them to continue treatment. They preserve the relations of the worker and the medical department in the best professional tradition. Such employers are to be commended for thus contributing to the advance of preventive medicine.

This matter has been considered of sufficient importance by the United States Public Health Service* to warrant the advocacy of a special program concerning the handling of syphilis among employees. The recommendations are

That routine blood tests be taken on applicants for employment.

That routine blood tests be taken at the time of periodic re-examination of employees.

That industry, with its compact organization develop a vigorous educational program.

That industry extend its educational campaign into the field of prophylaxis.

That responsibility upon the industrial medical officer to see that adequate modern treatment is available to employees at prices ordinary wage earners can afford be fully recognized. If such treatment is not available in private practice or at public clinics, industrial medical service should undertake such treatment.

That syphilis be handled at all times as merely another communicable disease. The privacy of relations between the worker and the medical service should be preserved in the best professional tradition. When treatment is properly required in ordinary cases this cannot be regarded as ground for discrimination of any kind against employees.

If all physicians having part-time or full-time positions with industrial concerns are willing to co-operate in urging the adoption of this program by industry, much will be gained toward the eradication of syphilis and the prevention of lowered earning capacity due to its late manifestations.

Release (No. 15-91) from United States Public Health Service, dated January 6, 1939.

MEDICAL EPONYM

ADDISONIAN ANEMIA AND ADDISON'S DISEASE

At a meeting of the South London Medical Society on Thursday, March 15, 1849, according to an unsigned report of the proceedings published in the *London Medical Gazette* (N S 8 517-518, 1849), it is stated

Dr Addison, at the request of the President, proceeded to describe a remarkable form of anaemia, which, although incidentally noticed by various writers, had not attracted, as he thought, by any means the attention it really deserved. It was incident to adult males usually occurs between the ages of twenty and sixty more frequently commencing insidiously and proceeding very slowly relaxation and flabbiness, rather than wasting of the flesh, being one of the most remarkable features of the disorder. Dr Addison next proceeded to give the details of several cases [of another disease] which had fallen under his own immediate observation. In only two of these did the patients recover. In three cases only was there an inspection of the body after death, and in all of them was found a diseased condition of the supra-renal capsules.

The above is the first published reference to Addison's description of these two diseases.

Thomas Addison (1793-1860), then senior physician to Guy's Hospital, London, published his famous monograph, *On the Constitutional and Local Effects of Disease of the Supra-Renal Capsules* (London: Samuel Highley), in 1855, in which appear the following accounts (pages 2 and 3, and 4 and 5).

For a long period I had from time to time met with a very remarkable form of general anaemia, occurring without any discoverable cause whatever, cases in which there had been no previous loss of blood, no exhausting diarrhoea, no chlorosis, no purpura, no renal, splenic, miasmatic, glandular, strumous, or malignant disease. Accordingly, in speaking of this form of anaemia in clinical lecture, I, perhaps with little propriety, applied to it the term 'idiopathic,' to distinguish it from cases in which there existed more or less evidence of some of the usual causes or concomitants of the anaemic state.

The disease presented in every instance the same general character, pursued a similar course, and, with scarcely a single exception, was followed, after a variable period, by the same fatal result. It occurs in both sexes, generally, but not exclusively, beyond the middle period of life, and so far as I at present know, chiefly in persons of a somewhat large and bulky frame and with a strongly marked tendency to the formation of fat. It makes its approach in so slow and insidious a manner, that the patient can hardly fix a date to his earliest feeling of that languor, which is shortly to become so extreme. The countenance gets pale, the whites of the eyes become pearly, the general frame flabby rather than wasted, the pulse perhaps large, but remarkably soft and compressible, and occasionally with a slight jerk, especially under the slightest excitement, there is an increasing indisposition to exertion, with an uncomfortable feeling of

faintness or breathlessness on attempting it, the heart is readily made to palpitate, the whole surface of the body presents a blanched, smooth and waxy appearance, the lips, gums and tongue seem bloodless, the flabbiness of the solids increases, the appetite fails, extreme languor and faintness supervene, breathlessness and palpitations being produced by the most trifling exertion or emotion, some slight oedema is probably perceived about the ankles, the debility becomes extreme, the patient can no longer rise from his bed, the mind occasionally wanders, he falls into a prostrate and half torpid state, and at length expires nevertheless at the very last, and after a sickness of perhaps several months' duration, the bulkiness of the general frame and the amount of obesity often present a most striking contrast to the failure and exhaustion observable in every other respect.

With, perhaps, a single exception, the disease, in my own experience, resisted all remedial efforts, and sooner or later terminated fatally. On examining the bodies of such patients after death, I have failed to discover any organic lesion that could properly or reasonably be assigned as an adequate cause of such serious consequences.

It was whilst seeking in vain to throw some additional light upon this form of anaemia, that I stumbled upon the curious facts, which it is my more immediate object now to make known to the Profession.

The leading and characteristic features of the morbid state to which I would direct attention are anaemia, general languor and debility, remarkable feebleness of the heart's action, irritability of the stomach, and a peculiar change of colour in the skin, occurring in connexion with a diseased condition of the "supra-renal capsules."

This discoloration pervades the whole surface of the body, but is commonly most strongly manifested on the face, neck, superior extremities, penis and scrotum, and in the flexures of the axillae and around the navel. It may be said to present a dingy or smoky appearance, or various tints or shades of deep amber or chestnut brown, and in one instance the skin was so universally and so deeply darkened, that, but for the features, the patient might have been mistaken for a mulatto.

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FATAL PUERPERAL SEPSIS FOLLOWING
NORMAL DELIVERY

Mrs. M. C., a thirty-six-year-old woman, was admitted to the hospital on July 14, 1926, with a temperature of 102.6°F and a pulse of 100. Her fifth baby had been delivered normally at home thirteen days previously. She stated that, after

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

having been well since the birth of the baby, she felt poorly and complained of a good deal of pain and soreness in the lower abdomen on getting out of bed on the tenth day. The baby died on that day.

The family and past histories were not recorded, except that it was noted that the first pregnancy had resulted in a miscarriage at three months and that the next four babies were all delivered normally but died in infancy.

Physical examination on entrance showed a patient who was apparently not seriously ill. The breasts were lactating. The heart was essentially normal. There were a few rales in the bases of the lungs. The lower quadrants of the abdomen were spastic and tender. The uterus was in the midline, extended half the distance to the umbilicus and was very tender. Bilateral costovertebral tenderness was present.

A Wassermann test was negative. The blood showed a white-cell count of 14,800 and the urine contained many pus cells. A blood culture showed the presence of *Staphylococcus albus*.

The treatment was essentially conservative. The patient was given rectal fluids, the bladder was irrigated, and hot douches were administered. Her condition became progressively worse, and on the day following entry she was irrational. She died on July 21, one week after admission.

Comment. This is another case of a normal delivery which resulted in fatal puerperal sepsis. It is possible that in spite of the history there was fever before the tenth day. In cases in which the infection does not begin until the tenth day a fatal outcome is most unusual, except for those involved in a hospital epidemic, when the infection may start almost any time during convalescence.

The uterus was left entirely alone, but in spite of conservatism, the infection was overwhelming. Whether or not *Staphylococcus albus* was the etiologic agent was unproved, its recovery from a blood culture usually indicates contamination. The efficacy of the douches is open to question. They may do some good in low grade parametric infections, but there can be no rationale for their use in cases of general sepsis.

DEATHS

CRANDON—LE ROI G. CRANDON, M.D., of Boston, died December 27. He was in his sixty-seventh year. Born in Chelsea, he attended the Chelsea High School and Harvard University. He received his degree from the Harvard Medical School in 1898. Dr. Crandon was a house officer at the Boston City Hospital for two years and then began the practice of surgery. He was visiting surgeon at the Boston City Hospital from 1903 to

1918, assistant in surgery at the Harvard Medical School from 1904 to 1917 and secretary of the Suffolk District Medical Society from 1903 to 1908.

In 1917 Dr. Crandon organized Naval Station Hospital Unit No. 9 and entered the navy with the rank of lieutenant-commander, serving until 1919.

Dr. Crandon was a fellow of the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons.

His widow survives him.

HALL—JOSIAH N. HALL, M.D., of Denver, Colorado, died December 20. He was in his eighty-first year.

Born in North Chelsea, he received his degree from Harvard Medical School in 1882. Before moving to Colorado, he served as house physician at the Boston City Hospital for eighteen months. He practiced in Colorado for fifty-four years. At the time of his death, he was professor of medicine, emeritus, at the University of Colorado School of Medicine. He was also a past president of the Colorado State Board of Medical Examiners and the Colorado State Board of Health and had served as a physician for the city and county of Denver.

Dr. Hall was a former member of the Massachusetts Medical Society and was a fellow of the American Medical Association, the American College of Physicians and the American Clinical and Climatological Association.

JACOBS—HENRY B. JACOBS, M.D., of Baltimore, Maryland, died December 20. He was in his eighty-second year.

Dr. Jacobs was born in Scituate and attended Harvard University. He received his degree from Harvard Medical School in 1887 and interned at the Massachusetts General Hospital. He joined the staff of the Johns Hopkins Hospital in Baltimore, where he became an authority on tuberculosis.

Dr. Jacobs was a former member of the Massachusetts Medical Society and was a fellow of the American Medical Association.

CORRESPONDENCE

SUGGESTION FOR A NEW COMMITTEE

To the Editor. The communication published in the December 7 issue of the *Journal* from Medical and Surgical Associates, suggests the possible development in Massachusetts of prepaid medical care furnished by group medical practice. It is to be expected that after and possibly during an experimental period, should this method appear to the public sound and desirable, such groups will multiply and render service in a variety of ways.

If and when such types of contract medicine increase and multiply the greatest danger—both to the public and to the profession—will be from inadequate personnel and poor service. In the past, some forms of contract medicine have resulted in a deterioration of medical service. It is of interest to organized medicine and to the public that this should not happen in the future. In helping to avoid this danger and at the same time in permitting experimental solution of the economic and medical problems involved lies a great opportunity of organized medicine to be of service to the public. Within organized medicine is to be found the only group of experts who can properly appraise the quality of medical care provided by group medical practice and effectively pass judgment on such practice for the purpose of maintaining and improving the standards of medical care.

I therefore suggest that the Massachusetts Medical Society might wisely set up a committee charged with the duty to study the quality of medical care which such groups give and to report its findings to the Society. It seems probable that it would be wise to set up for this purpose a new committee, since the work might well become burdensome and be somewhat different from that of any of the present existing committees. This committee should be composed of men steeped in the wisdoms of clinical medicine, but it might also wisely include physicians primarily concerned with the fundamental sciences and with hospital administration.

Such a committee representing the Massachusetts Medical Society, which has long held a high position in the public regard, might have a tremendous influence not only in collecting facts upon which the official opinions of the Society might be based, but in influencing public opinion through which, in the last analysis, the medical profession can most certainly influence social changes.

REGINALD FITZ

319 Longwood Avenue
Boston

A RECOMMENDATION

To the Editor I recently saw the motion picture, "Disputed Passage." I want to recommend it to those physicians who have organized to distribute medical services on the combined insurance and chain store plan. I should also recommend it to those physicians who contemplate selling their services to the Medical and Surgical Associates, for resale through Health Service, Incorporated, to the individual.

The picture is not on the theme of socialized medicine or the chain store type of distributing medical services, but it points a moral that should be instructive to those working to separate the general practitioner from his patient.

JOHN F. CASEY, M.D.

475 Commonwealth Avenue,
Boston

REPORTS OF MEETINGS

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on October 24, with Dr. Soma Weiss presiding.

As an introduction two cases of jaundice were presented. The first of these was that of a forty-nine-year-old man who had showed almost complete lack of bile pigments in the stools since the beginning of his jaundice three weeks before entry. The diagnosis had not been definitely established but lay between catarrhal jaundice and pancreatic carcinoma. The second case was that of a thirty-nine-year-old woman who had had a cholecystectomy for stones in May, 1939. At that time the common duct was explored and said to be normal, fifteen days postoperatively bile had drained through the wound. Since operation she had had several attacks of pain in the right upper quadrant, one of which was associated with jaundice and itching. The diagnosis on this admission was thought to be common-duct stone.

Dr. Otto Schales, the principal speaker of the evening, was then introduced. His topic was "Pseudohemoglobin and Related Compounds in Health and Disease."

After a few preliminary remarks on the structure and chemical reactions of hemoglobin and an enumeration of other iron-containing physiological substances, Dr. Schales discussed the properties of pseudohemoglobin.

When normal blood is treated with dilute hydrochloric acid, ionized iron is liberated in constant amounts (about 15 mg per liter of blood). It has been shown that this iron is not derived from hemoglobin but from related compounds, "E" and "E₁" which occur in the red blood cells.

It has been shown that compound "E" reacts with carbon monoxide and that its relative carbon monoxide affinity is about ten times greater than that of hemoglobin. In combination with carbon monoxide, compound "E" will not liberate ionized iron when treated with dilute hydrochloric acid. This fact has been utilized in testing for low concentrations of carbon monoxide in the blood, since the carbon monoxide combines first with compound "E" and later with hemoglobin. Even when spectroscopic examination of a blood suspected of containing carbon monoxide fails to reveal the presence of carboxyhemoglobin, treatment of the blood with dilute hydrochloric acid will fail to release ferrous ion in normal amounts when even very small quantities of the gas are present. As the patient recovers from his exposure to the gas, the ionized iron obtainable rises to a normal value.

Chemical studies have shown that compound "E" contains a pseudohemin in which the porphyrin ring, which is closed in hemoglobin, is open. Compound "E" has been called alpha pseudohemoglobin to denote this relation. Alpha pseudohemoglobin will react with carbon monoxide as related above, but not with cyanides. It can be converted to a related compound in which the iron contained within the molecule is in the ferric state—a substance analogous to methemoglobin—and which normally represents about one third of the "easily split off" iron in blood. This substance is known as alpha pseudomethemoglobin or compound "E₁", it reacts with cyanides but not with carbon monoxide. The other reactions of alpha pseudohemoglobin and alpha pseudomethemoglobin are similar to their related compounds, hemoglobin and methemoglobin, with which they are identical so far as the protein (globin) as bearer of the prosthetic groups is concerned.

Hemoglobin may be converted into alpha pseudohemoglobin by means of hydrogen peroxide in presence of potassium cyanide and also by certain reducing agents in presence of oxygen. Perhaps the ascorbic acid in the blood, acting by producing nascent hydrogen peroxide, is responsible for the normal breakdown of hemoglobin into bile pigment by this route, with pseudohemoglobin and pseudomethemoglobin as intermediate products of bilirubin formation. Since hydrogen sulfide produces hydrogen peroxide in the presence of oxygen, sulfhemoglobin may be closely related to the pseudohemoglobins.

Little is known about the blood level of pseudohemoglobins in pathologic conditions. It is about half normal in pregnancy, carcinomatosis and habitual tobacco smokers. It is three-quarters normal in cases of general paresis following malaria treatment and less than half normal in lead poisoning. These values are independent of the blood hemoglobin levels.

Dr. Schales demonstrated his method of detecting hydrogen peroxide in dilutions as high as 1:100,000,000. In alkaline solution with mesohemin and Luminal present, hydrogen peroxide gives a brilliant luminescent light which is quite striking.

Dr. E. J. Cohn in discussing the paper suggested that the study of pseudohemoglobins might be of great im-

portance because changes related to them appear before changes related to hemoglobin and in spite of compensatory mechanisms which keep hemoglobin normal.

Dr Arnold P. Meiklejohn pointed out the fact that the previous theory was that hemoglobin was broken down normally by conversion into porphyrin. If it is true that hemoglobin is converted normally into pseudohemoglobin by breakage of the porphyrin ring then the presence of porphyrin in the urine takes on a pathological significance hitherto unappreciated.

NOTICES

CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held on Monday, January 15 at 11:30 a.m.

PROGRAM

Case Reports

Femoral embolectomy

Habitual abortion.

Subacute bacterial endocarditis.

Physicians and medical students are cordially invited to attend.

ROY J. HEFFERNAM M.D., *Secretary*

BOSTON CITY HOSPITAL

Dr Oscar Hirsch formerly professor of laryngology at the University of Vienna will give a lecture on "Tumors of the Pituitary Body" on Thursday, January 18 at 11:00 a.m., in the Cheever amphitheater.

The medical profession is cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, January 17, from 2 to 4 p.m. Drs. W. T. Green and E. A. Stead will speak on "Painful Feet." A clinicopathological conference conducted by Dr. E. C. Outler will take place from 4 to 5 p.m.

On Thursday, January 18 from 8:30 to 9:30 a.m. there will be at the Children's Hospital, a combined clinic, conducted by Dr. K. D. Blackfan of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend.

BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library, 8 Fenway Boston on Monday evening January 15 at 8:15. Dr. Fuller Albright will talk on "Hyperparathyroidism."

All those interested in the subject are cordially invited to attend.

PAUL D. WHITE, M.D., *President*
BENJAMIN SPECTOR M.D., *Secretary*

BOSTON LYING-IN HOSPITAL

Dr. George V. Smith will speak on "Hormonological Aspects of the Toxemias of Pregnancy" before the Journal Club at the Boston Lying-in Hospital, on Tuesday evening, January 23 at 8:15.

FREE PUBLIC LECTURES

The Quincy City Hospital in conjunction with the Social Service Committee, is offering a course of free

health lectures, to be given in the Administration Building of the Hospital at 3:00 p.m. on Sundays. The schedule is as follows:

- January 14 Prevention and Control of Disease. Dr. Charles F. Wilensky
- January 21 Heart Disease. Dr. Arthur Rapoport.
- January 28 Planning the Family Menu for Better Health with Consideration to the Budget. Miss Marion D. Floy
- February 4 Food and Its Influence on the Teeth. Miss Ruth L. White.
- February 11 Mental Health for the Adult. Dr. Arthur Berk.
- February 18 Headaches Causes and treatment. Dr. Alfred V. Mahoney
- February 25 Diet During Infancy and Childhood. Dr. Edmund B. Fitzgerald and Miss Anne Morin.
- March 3 Diseases of the Skin. Dr. Francis P. McCarthy
- Hygiene of the Skin. Miss Margaret G. Reilly
- March 10 Sulfanilamide and Sulfapyridine. Dr. Burton Elder

HAMPDEN DISTRICT MEDICAL SOCIETY

The regular winter meeting of the Hampden District Medical Society will be held in the rooms of the Springfield Academy of Medicine, 20 Maple Street, Springfield on Tuesday January 23 at 4:00 p.m.

Dr. Chester M. Jones will speak on "Substernal Pain a Confusing Symptom Its clinical significance. Discussion will follow.

Supper will be served at 6:00 p.m.

WAYNE C. BARNES *Secretary*

NORFOLK DISTRICT MEDICAL SOCIETY

The next meeting of the Norfolk District Medical Society will be held in the auditorium of the Norwood Civic Center Tuesday January 30, at 8:30 p.m. The meeting will be under the auspices of the staff of the Norwood Hospital. The Civic Center is adjacent to the hospital.

PROGRAM

Business Reports from committees.

Communications Papers by the Norwood Hospital staff.

Discussion.

Collation.

FRANK S. CRUICKSHANK, M.D., *Secretary*

LEWIS CASS LEDYARD JR., FELLOWSHIP

The Lewis Cass Ledyard Jr., Fellowship was established in 1939 by a gift from Mrs. Ruth E. Ledyard, wife of the late Lewis Cass Ledyard Jr., a governor of the New York Hospital. The income, amounting to approximately \$4000 annually will be awarded to an investigator in the fields of medicine and surgery or in any closely related field. This amount will be applied as follows: \$3000 as a stipend and, approximately \$1000 for supplies or expenses of the research. In making the award, preference will be given to young applicants who are graduates in medicine, and who have demonstrated fitness to carry on original research of high order. The recipient of this fellowship will be required to submit reports of his work under the fellowship either at stated intervals or at the end of the academic year and when the result of his work is published he will be expected to give proper credit to the Lewis Cass Ledyard Jr., Fellowship. The research work under this fellowship is to be carried on at the New York Hospital.

and Cornell University Medical College. The fellowship will be available on July 1 at the beginning of the academic year. Applications for the year 1940-41 should be in the hands of the committee by February 15. It is expected that the award will be made by April 1.

Application for this fellowship should be addressed to Committee of the Lewis Cass Ledyard, Jr., Fellowship, The Society of The New York Hospital, 525 East 68th Street, New York City.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JANUARY 15

MONDAY JANUARY 15

- *11 30 a.m. Monthly clinical meeting Carney Hospital
- *12 15-1 15 p.m. Clinicopathological conference Dr S Burt Wolbach Peter Bent Brigham Hospital amphitheater
- 5 p.m. Cutter Lecture Harvard Medical School Amphitheater E.
- *8 15 p.m. Boston Medical History Club Boston Medical Library 8 Fenway

TUESDAY JANUARY 16

- 9-10 a.m. Nephritic Clinic Presentation of cases Dr R W Buck Joseph H Pratt Diagnostic Hospital
- 10 a.m.-12 30 p.m. Boston Dispensary tumor clinic
- 12 m. South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston
- 12 15-1 15 p.m. X ray conference Dr Merrill C Sosman Peter Bent Brigham Hospital amphitheater

WEDNESDAY JANUARY 17

- 9-10 a.m. Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital
- *12 m. Clinicopathological conference Children's Hospital amphitheater
- *2-4 p.m. Joint medical and surgical clinic Peter Bent Brigham Hospital

THURSDAY JANUARY 18

- *8 30-9 30 a.m. Combined clinic of the medical surgical orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital at the Children's Hospital
- 9-10 a.m. Surgical case clinicopathological presentation Dr H F Day Joseph H Pratt Diagnostic Hospital
- 11 a.m. Tumors of the Pituitary Body Dr Oscar Hirsch Boston City Hospital

FRIDAY JANUARY 19

- 9-10 a.m. A Discussion of Rheumatic Fever Dr T Duckett Jones Joseph H Pratt Diagnostic Hospital
- 10 a.m.-12 30 p.m. Boston Dispensary tumor clinic
- *1 p.m. Urological conference at the Massachusetts General Hospital lower amphitheater Out Patient Department
- *12 m. Clinical meeting of the Children's Medical Service Massachusetts General Hospital Ether Dome

SATURDAY JANUARY 20

- 9-10 a.m. Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital
- *10 a.m.-12 m. Medical staff rounds of the Peter Bent Brigham Hospital Conducted by Dr Soma Weiss

SUNDAY JANUARY 21

- 4 p.m. What about Sulfanilamide? Dr Chester S Keefer Free public lecture. Harvard Medical School amphitheater of Building D

Open to the medical profession

JANUARY 18 — Combined clinic of the medical surgical orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital Page 77

JANUARY 19 — Staff meeting United States Marine Hospital Page 39 issue of January 4

JANUARY 22-25 — American Academy of Orthopaedic Surgeons Hotel Statler Boston

JANUARY 23 — Boston Lying In Hospital Page 77

JANUARY 24 — New England Society of Physical Medicine Hotel Lenoxmore Boston

FEBRUARY 8 — Pentucket Association of Physicians 8 30 p.m. Hotel Bartlett Haverhill

FEBRUARY 11-14 — International College of Surgeons Page 759 issue of November 9

FEBRUARY 22-24 — American Orthopsychiatric Association Page 957 issue of December 14

MARCH 2 JUNE 8 and 10 — American Board of Ophthalmology Page 719 issue of November 2

MARCH 7-9 — The New England Hospital Association Hotel Statler Boston

APRIL 24-26 — Scientific Session Academy of Physical Medicine. Hotel John Marshall Richmond Virginia

MAY 10-18 — American Scientific Congress Page 1043 issue of December 28

MAY 14 — Pharmacopoeial Convention Page 894 issue of May 25

JUNE 7-9 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

FEBRUARY 14 — Cough Sputum Hemoptysis — How shall they be investigated? Dr Reece H Betts Essex Sanatorium Middleton

MARCH 6 — Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcal Infections Dr Champ Lyons Lynn Hospital Lynn

APRIL 3 — Addison Gilbert Hospital Gloucester

MAY 8 — Annual meeting Salem Country Club Peabody

HAMPDEN

JANUARY 23 — Page 77

HAMPSHIRE

MARCH 13

MAY 8

Meetings are held at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MARCH 20

MAY 15

Meetings are held at 12 15 p.m. at the Unicorn Country Club Stoneham.

MIDDLESEX NORTH

JANUARY 31

APRIL 24

JULY 31

OCTOBER 30

NORFOLK

JANUARY 30 — Page 77

NORFOLK SOUTH

FEBRUARY 1

MARCH 7

APRIL 4

MAY 2

All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon

PLYMOUTH

JANUARY 18 — Brockton Hospital Brockton

MARCH 21 — Goddard Hospital Brockton

APRIL 18 — State Farm

MAY 16 — Lakeville Sanatorium Lakeville

SUFFOLK

JANUARY 31 — Scientific meeting Subject to be announced later

MARCH 27 — Scientific meeting Symposium on Ulcerative Colitis and Diarrheas Under the direction of Dr Chester M Jones

APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

WORCESTER

FEBRUARY 14 — Worcester State Hospital

MARCH 13 — Worcester Memorial Hospital

APRIL 10 — Worcester Hahnemann Hospital

MAY 8 — Worcester Country Club

Each meeting begins with a dinner at 6 30 p.m. and is followed by a business and scientific meeting

JANUARY 12 — United States Marine Hospital Page 1043 issue of December 28

JANUARY 14 — Free public lecture Harvard Medical School Page 1042 issue of December 28

JANUARY 14 — Salem Hospital public lecture. Page 1042 issue of December 28

JANUARY 14-MARCH 10 — Free public lectures Quincy City Hospital Page 77

JANUARY 15 and 16 — Second Annual Congress on Industrial Health Page 39 issue of January 4

JANUARY 15 and 22 — Cutter Lectures Page 1042 issue of December 28

JANUARY 15 — Boston Medical History Club Page 77

JANUARY 15 — Monthly clinical meeting Carney Hospital Page 77

JANUARY 16 — South End Medical Club Page 38 issue of January 4

JANUARY 17 — Joint medical and surgical clinic Peter Bent Brigham Hospital Page 77

JANUARY 18 — Tumors of the Pituitary Body Dr Oscar Hirsch Boston City Hospital Page 77

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THE TREATMENT OF PILONIDAL SINUS IN HOSPITAL PRACTICE*

HORATIO ROGERS, M.D.†

BOSTON

THE lesion commonly known as pilonidal sinus offers to the embryologist an interesting subject for speculation, but to the surgeon it presents essentially the problem of making a wound heal in a place where it does not want to heal. The suggestions for curing this trouble some lesion are many and ingenious, but as elsewhere in medicine the very multiplicity of remedies is evidence that not one is entirely satisfactory.

Patients will be cured and will fail to be cured by all the methods of treatment described in the literature, and some of the cures will be brilliant and some of the failures will be most distressing. The average surgeon who is called upon to treat an occasional case finds it difficult to evaluate the usefulness of various methods and is inclined to stick to the one with which he is familiar. The same is true in hospital practice where the changing personnel of the resident staff permits of no evaluation of methods so that the same traditional method is likely to be passed along for years regardless of the end result.

At the Massachusetts General Hospital our failures have been reduced from about 30 per cent to the neighborhood of 3 per cent since 1932, when a special study of this disease was undertaken and it is now believed that an account of our experience may be of sufficient interest to warrant a brief presentation.

Prior to 1932, all cases of pilonidal sinus were operated on in the hospital, and followed in the Out Patient Department, so that some of our poor results could be ascribed to the division of responsibility between the surgeon who did the operation and the various surgeons who carried out the aftercare. We have now simplified the operation to the status of an outpatient procedure and have largely eliminated this division of responsibility.

In 1932 an analysis and follow up of the cases

of 119 patients treated during the eight preceding years showed that 30 per cent had not been cured of their disease.¹ These patients had all been operated on under general or spinal anesthesia. In most cases an attempt had been made to outline the extent of the sinus by the injection of methylene blue into the main opening. Radical excision had then been done of a block of skin and fat large enough to ensure the removal of all diseased tissue. Frequently the coccyx and sacral periosteum had been removed when found stained by dye. The wounds were often very large. Some of the wounds had been closed, with or without drainage, by undercutting, by plastic flaps and by deep stay sutures in an effort to eliminate dead space. The rest had been packed wide open with gauze. The average postoperative hospital stay had been eleven days. In the cases which were cured the average time of wound healing had been about three months and many of the resultant scars were large unsightly and uncomfortable.

On the basis of this investigation it was apparent that many of our difficulties were directly related to the large size of the wounds. We are now convinced that except in rare cases such large wounds are entirely unnecessary and that the morphological conception on which they were based is fallacious.

In order to reach this conclusion it was necessary to undertake a pathological study of a number of surgical specimens from representative cases. Therefore, between 1932 and 1934, 72 additional radical excisions were done, primarily with the purpose of securing pathologic material for study, but also for the opportunity of making careful clinical observations on a controlled series of cases. About half the operations were done by me personally, and the rest were performed under my close supervision, but in spite of scrupulous attention to the choice of procedure and details of technique our results were not

*Read at the annual meeting of the New England Surgical Society, Salem, September 29, 1939.

†Assistant in surgery Harvard Medical School; assistant surgeon Massachusetts General Hospital.

improved in any respect over those of previous years

Meanwhile a painstaking examination of the surgical specimens was being carried out by Dr Marshall G Hall of the Pathological Department, and his study revealed four facts of the greatest practical importance³

First, with regard to morphology, over 70 per cent of the sinus tracts were simple midline structures which could have been included in a piece of tissue 2 by 2 by 5 cm

Second, the coloring matter which had been injected during life, and which was interpreted at operation as indicating fine ramifications of the sinus tract, was seen on microscopic examination to be filling lymphatic trunks in perfectly normal tissues

Third, infection was found to be present in every case, and the only changes seen to have taken place were those caused by infection. There was no evidence that the epithelial rests constituting the original congenital defect had any tendency to extend except as they were forcibly displaced by abscess and scar-tissue formation

Fourth, the almost universal belief that recurrent sinuses after surgical excision were always due to incomplete removal of epithelial tissue was disproved by demonstrating its absence in a number of specimens from recurrent cases. Furthermore, the cause of these recurrences was shown to have been infected dead space and nothing else

All these findings led to the conclusion that large radical excisions are unnecessary and that the problem is chiefly one of wound healing in the presence of infection. It remained to apply these ideas to the actual treatment of patients. In 1935 we began the conservative excision of pilonidal sinuses in the Out Patient Department⁴. The tissues were locally infiltrated with novocain containing adrenalin, and the sinus tract and hair nest were dissected out through a midline skin incision in a nearly bloodless field by means of a small cautery blade. The resultant narrow wound was then packed with gauze, and the patient was allowed to go home. In most cases this proved to be a minor procedure requiring from twenty to thirty minutes and causing the patient no more reaction than does the excision of a wen. Several patients returned to their work or attended a ball game or a dance on the day of operation. We soon discovered, however, as was to be expected, that the occasional patient with a lesion complicated by extensive scarring was best managed in the hospital under a general anesthetic. Of the 150 cautery excisions done between 1935 and 1937, 14 were done in the hospital and 136 in the Out Patient Department

All the wounds were left open because we believed them all to be infected, and because the natural way for infected wounds to heal is by second intention. The patients returned Mondays and Thursdays to have their dressings done by the surgeon who operated on them, and each surgeon exerted himself to have his patients heal the fastest of any. The shortest healing time in this series was five weeks, but more recently it has been reduced to four weeks. Except for certain cases of definitely delayed healing, the average time was about nine weeks. The wounds healed to a soft, inconspicuous linear scar.

The fact that 97 per cent of these patients were cured by a conservative excision and have stayed cured for one to four years convinces me that large block excisions of tissue carried out under the deceptive guidance of injected coloring matter are neither necessary nor desirable. This belief is apparently gaining ground, at least locally, since 70 additional cautery excisions have been done at the Massachusetts General Hospital in the past year and a half by the resident staff and by seventeen different members of the visiting staff, as compared with only 8 radical block excisions.

The establishment of this principle simplifies the treatment of pilonidal sinus, but it falls far short of solving its problems. There will always be a small proportion of troublesome cases which will be hard to cure by any method. All pilonidal sinuses have something in common: they originate in the midline and are infected, but beyond that they may show every variation from the simplest to the most complex. Therefore we must recognize that they cannot all be treated alike. Our experience has been that in hospital practice the procedure of conservative cautery excision and healing by second intention comes within the reach of more patients and gives better results than any other method we have tried, and if a single method of treatment must be adopted as a routine, this is probably the best one at the present time.

Although this paper is primarily concerned with the treatment of hospital patients it applies, with certain modifications, to private patients as well. I have done a number of cautery excisions in my office without encountering trouble, but because of the uncertainty of knowing in advance just how extensive the excision may need to be, I prefer to do such excisions in the hospital. The situation is a little different in an outpatient department, where a patient may be kept overnight in the emergency ward if it seems desirable. Furthermore, most private patients themselves prefer to be in the hospital where they can be waited on for a day or two afterward. And there is

nothing to be gained by avoiding hospitalization, since the question of divided responsibility does not arise.

Perhaps the most important reason for hospitalizing the private patient, however, is the chance it gives for varying the operative procedure in accordance with the actual findings. The use of the cautery is not essential in doing a successful conservative excision, it simply facilitates it by providing an almost bloodless field. The same thing can be done by careful sharp dissection and the use of a little more adrenalin in the novocain and if the defect is small and not too badly infected to interfere with primary healing, it may be sutured by some one of the technics described in the recent literature, with a reasonable chance of cure.

CONCLUSION

A six years experience in the treatment of pilonidal sinus at the Massachusetts General Hospital has convinced me that most failures are not due to incomplete excision of diseased tissue but to faulty wound healing caused by infection and retained dead space, that there is no practical or theoretical justification for the radical excision of large blocks of normal skin and subcutaneous tissue, and that in unselected cases the highest percentage of cures can be obtained by conservative excision of the sinus tract and hair nest under direct vision, followed by solid second intention healing of the open wound, with the patient ambulatory and under the care of the same surgeon from first to last.

264 Beacon Street.

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2. Rogers, H., and Hall, M. G.: Pilonidal sinus: surgical treatment and pathologic structure. *Arch. Surg.* 51:747-756 1935.
3. Rogers H. and Dwight, W. W.: Pilonidal sinus: observations on one hundred and forty cases treated by cautery excision. *Ann. Surg.* 107:400-418, 1938.

DISCUSSION

DR. WALFORD T. REES, Burlington, Vermont: Dr. Rogers has given us all something to think about. I have had no experience with the use of cautery excision of pilonidal sinus. I have had some little experience with other methods of treatment and most of it has been rather disappointing. I looked up our records at the Mary Fletcher Hospital during the past ten years. There were 35 cases of pilonidal sinus which had been taken care of by several operators. I attempted to follow up the records of these cases, but was unsuccessful except for my own cases, which numbered 15. Thirteen were operated on by block dissection and some method of flap repair. There were 5 recurrences among the 13 cases, or 38 per cent, which is, of course, too much. Two cases operated on by block excision and then packed wide open had no recurrence.

Now if Dr. Rogers, by his method, can show us only 3 per cent recurrences, it is probably the method for all of us to use. He says that it should be done by one surgeon

familiar with the operation and my experience, particularly with the aftercare leads me to subscribe to that.

I agree heartily with Dr. Rogers that most of our recurrences are due not to the fact that some sinus was left at the time of the original operation but to neglect in the care of the wound. This is very important, because, I believe, this condition happens most frequently in hairy individuals, and if at the time of dressing we are not careful to shave the surrounding skin and prevent the edges of the wound from invaginating we shall get recurrences.

The flap operation in certain cases has a great deal to recommend it. If you can send a patient into the hospital remove a sinus and do a flap operation, covering over the lower end of the scarum, the patient can be discharged from the hospital in from five to seven days, and if there is no infection the patient does not have to have dressings for six to nine months. This method has a great deal to recommend it, and I am sure that the patient who receives this type of operation likes it better than having to have dressings for a long time. Unfortunately we get a high percentage of recurrences.

Possibly early cases of pilonidal sinus which have not been the seat of frequent infections abscess formation and accessory sinuses may still be treated by the flap method. Probably in the majority of cases that have had frequent bouts of infection multiple sinus formations are best treated by excision, either by the cautery as described by Dr. Rogers or by wide-open packing with careful, frequent dressings.

DR. CARL H. STEVENS, Belfast Maine: In reviewing the literature, I find that several methods of treatment for this relatively rare condition have been advocated. The sclerosing method seems to have been discarded. Excision with primary union seems to be indicated in uninfected cases, but as most of the cases when seen are already infected to attempt to obtain primary union seems rather unwise. Therefore the method most highly favored is excision and wide excision.

Until Dr. Rogers developed his method it seems that excision by the knife, using a wide elliptical incision down to the fascia was the method of choice, but I think that he has shown definitely that the use of the electric cautery has a distinct advantage, as it reduces both the time required to obtain a permanent cure and the rate of recurrence.

DR. FRANK H. LAHEY, Boston: Inasmuch as we have published a method of treating these cases radically, it becomes my duty to say that since Dr. Rogers has developed this method we have treated almost none by the radical method. His method is the one we have taken up and applied, and we have had just the same degree of satisfaction that he has had. I think it is a real advance.

DR. DANIEL C. PATTERSON, Bridgeport, Connecticut: We have all had the experience with pilonidal sinuses of trying various methods to close them and to get primary union, but with infrequent success. We have excised the sinuses and packed the cavity with gauze. This method of healing by granulation has given good results, but entails a long period of dressing which is not very pleasant.

Dr. Rogers's procedure is without doubt the best universal method to be carried out when the operations are done in the outpatient department or by the resident staff, and also in badly infected cases; however, there are some cases I am sure, in which clean, early healing can be secured and the patient saved the inconvenience of months of dressing. Doubtless every surgeon has treated cases in which he had suspected that the sinus could probably be closed.

In such cases I have of late tried the following procedure, and in the few so far operated on have had most satisfactory results. The sinus and cyst are injected without force with a weak solution of methylene blue, and excised, care being taken not to remove too big an area of normal skin, bleeding is controlled and the cavity is closed up to the skin with fine chromic gut. No sutures are placed through the skin. I have assumed that if suppuration did occur it would work toward the surface, and not meeting the resistance of a skin sutured wound would cause but little trouble.

Whether or not the patients so treated will have trouble later on is of course yet to be discovered. I think that the procedure is worth trying in many cases, as the technic is so simple.

DR PETER P CHASE, Providence, Rhode Island. In July, 1938, I operated on a big, fat girl with pilonidal sinus, and the wound apparently healed at once. In May of this year I was much distressed to find a large abscess. I had to open it and found a cup or two of pus. The patient went away for the summer, but this fall she said that she still had a weeping sinus. Can I go ahead with the cautery and do as Dr Rogers has said and expect to get a perfect result?

DR PHILEMON E. TRUESDALE, Fall River, Massachusetts. Dr Lahey is always about two laps ahead of me, but I still stick to the radical operation because I think it does remove all the sinuses, and you only have to operate once.

DR JOHN HOMANS, Boston. In operating on this condition, I split the sinus and remove it with a heated instrument, but I believe it is possible to close the deeper part of the wound and leave the top part open, probably with less delay in healing.

DR ROGERS (closing). Dr Rees perhaps misunderstood me as meaning that only one surgeon should ever operate on pilonidal sinuses, and that it should become a specialty. I meant that each patient with a pilonidal sinus should be under the care of the same surgeon until cured. It was only for this reason that we believed it necessary to make the entire management an outpatient procedure.

Dr Stevens referred to the rarity of the disease. I think that it is for that reason that so many men who know far more about more important lesions are unable to evaluate the different methods which are described for managing this one.

As to lateral extensions, if the sinus opening is more than 3 cm from the midline, a right angle skin incision must be made out to it and 0.5 cm. beyond it. If it is closer to the midline, it is a simple matter to undercut

the skin to beyond the extreme lateral extent of the abscess wall.

Dr Patterson spoke of partial closure. We have had experience with partial closure of different kinds, and have abandoned it because we believe that the recurrence or failure is due essentially to what may be called a soft tissue sequestrum hidden in the wound. The type of abscess that Dr Patterson mentioned is commonly seen after partial or complete primary closures in which, owing to dead space, second intention healing is allowed to take place out of sight. I have watched cases of that sort in an open wound and have seen a place where the blood supply was apparently inadequate to support normal granulation tissue become farther and farther depressed below the level of the actively growing granulation, and finally have seen the active granulation close in over it and make a little vacuole with chronically infected granulation tissue walls. The wound then continued to heal up to the top, and the scar healed across it, hiding the infected dead space from sight. Weeks or months later the abscess came and the recurrent sinus developed. Such a sequence can be prevented in an open wound. In a closed or semiclosed wound it accounts for many failures.

The recurrent case of Dr Chase can be operated on by this technic exactly as the primary case can be, but in the presence of extensive scar tissue it is impossible to get adequate anesthesia with novocain, and a general anesthetic has to be used.

If our experience had been the same as Dr Truesdale's, namely that only one operation is necessary provided it is radical enough, I should perhaps favor doing the radical operation. But I have not found that to be true. Our failures following radical excision amounted to 18 per cent even when the wounds were packed wide open. Disregarding the way the wounds were handled, radical excision resulted in failure for 50 of the 140 patients in our earlier series.

In closing, I do not mean to leave the impression that cautery excision is the only way in which pilonidal sinuses can be cured. By a proper selection of cases, some of them can be excised cleanly enough and closed right off by some of the methods described, with a fair expectation of cure. I do not believe that this can be successfully done in a general hospital clinic, and I suspect that any surgeon who attempts it in private practice is risking the loss of more than he stands to gain if successful. If he succeeds, he is excused from a number of dressings and the scar will not be any better, but if he fails, he has the whole thing to do over again and possibly more than once. Nevertheless, and subject to those limitations, I think that there is a place for some of the various methods that have been described for primary closure of these wounds.

PRESIDENT'S ADDRESS*

CLARENCE O COBURN, M.D.†

MANCHESTER, NEW HAMPSHIRE

DURING the past year, I have had the honor of serving this society as its one hundred and forty-seventh president. The task has not been too arduous, and I feel more than recompensed for the effort I have expended. The visits to the several county societies have been especially pleasant. Here I have had the opportunity not only to meet many old friends, but also to get acquainted with many physicians whom I had not previously known, and have been privileged to listen to their scientific papers and to enter into their discussions. I never come away from one of these meetings without a deeper appreciation of the value of the work being done by the members of our society, and I especially urge all members to attend these meetings each spring and fall. In these small groups—component parts of the New Hampshire Medical Society—one and all may express their views, ask questions or discuss any topic that may interest them, with less formality than in a large meeting such as that we are attending today.

In two years, the New Hampshire Medical Society will celebrate its one hundred and fiftieth anniversary, and at that time I hope the officers and committees will make every effort to have this a gala occasion.

Many changes in the practice of the healing art have taken place since the Society was founded. Advances have constantly been made in all its branches. New instruments and apparatus have been developed to make diagnoses more exact. New drugs, surgical procedures and other forms of therapy have made possible more rapid and successful recoveries. During this time of phenomenal scientific advancement, we have been prone to ignore the social and economic side of the practice of medicine, and we are now confronted with what we regard as a radical change in and a challenge to our rights as practicing physicians. For years the State has increasingly assumed the care and treatment of various diseases and conditions which were formerly the problems of the individual physician. All doctors will agree that there are certain conditions affecting the public welfare which can be treated more effectively as a state project. Especially is this true of certain mental conditions, of the control and prevention

of contagious diseases, of the infirmities which may eventually make the individual a public charge, of sanitation and of any condition affecting the public health. All these have necessitated the formation of many agencies, the establishment of a number of institutions and the expenditure of large sums of money for their maintenance. This has actually put the State into the practice of medicine. While all this has no doubt been necessary and inevitable, I, for one, did not appreciate the magnitude of the work or understand the functions of the several agencies until as your president I visited the institutions and talked to the heads of the many departments. As it will probably be impossible for each one of you to become familiar with these organizations and to visit the institutions, perhaps my impressions and findings will be of value to you.

THE STATE HOSPITAL

The largest of our institutions is the New Hampshire State Hospital at Concord which opened its doors in October, 1842, with facilities for 96 patients. Today there are fifteen buildings with a total of forty-eight wards, the maximum desirable capacity of which is 1565 but there are actually 2219 patients, or, an overload of more than 600. The greatest appreciable increase was between the years 1903 and 1914 during which period the mentally ill patients who were being cared for at the different county institutions were transferred to the State Hospital. However, this increase in population has continued at about the same rate to the present date, owing to a number of causes. There was a time when these patients could be cared for in their homes or in private institutions, but economic conditions have necessitated their depending more and more on the State. Another contributing factor is that the general public has become hospital-conscious, and realizes that the hospital is a place for the treatment and cure of the mentally ill rather than just a place of retention for these unfortunates, so today it is the exception rather than the rule that these patients are treated at home. The New Hampshire State Hospital Survey of 1938, made by the State Planning and Development Commission, states that the hospital has two functions—to cure and improve the mental illnesses of the State's citizens and to act as a place

*An address read at the annual meeting of the New Hampshire Medical Society, Manchester, June 9, 1939.
†President, New Hampshire Medical Society.

of custody for those citizens who cannot be cured or improved

Keeping pace with this increase in hospital population has been a corresponding increase in the efficacy of the management and treatment. The hospital has a very efficient staff of specialists who employ all the modern equipment and therapeutic procedures. The death rate has decreased from 115 per 1000 in 1919 to about 60 in 1938.

The largest number of admissions are by certification of physicians, but there are also many voluntary ones, and some by court order. We are very fortunate in New Hampshire in being able to commit a patient on the certification of two physicians, whereas in some states an order of the court is required. This permits the earlier treatment which is essential in many cases to effect a cure. In making out certificates of commitment, physicians should give as clear a picture of the case as possible, fully answering all questions on the blank, and seeing that it is properly signed and sworn to, before sending a patient to the hospital. I am informed that in the past much inconvenience and considerable delay have been caused by the incompleteness of these legal forms.

I was considerably impressed by the manner in which the newly admitted cases are handled. They are placed in the admission ward, when possible, where they are studied by the staff, and after frequent consultations are placed in suitable surroundings and given the care required for their individual conditions. The staff is always willing to have, and welcomes, conferences and discussions with the committing physicians.

It can readily be seen that the present institution is much overcrowded and that additional facilities are needed to care for the overload. It has been recommended by the superintendent, Dr. Charles Dolloff, that there be some new construction at Concord and that the farm at this site be discontinued and a new farm procured at some place not more than thirty miles distant, with sufficient buildings and facilities to care for any surplus which may develop in the future.

The hospital also has other needs than that of additional room for patients. Much should be done in the prevention of mental diseases. For the last five years, through the work in the mental-hygiene clinics, a number of children have been found requiring hospitalization under psychiatric supervision. Unfortunately no hospital in the State has facilities for the care of these cases, and such a unit established at the State Hospital as a therapeutic and diagnostic center would serve an excellent purpose.

Epilepsy continues to be one of our problems.

At present these patients, if in the State Hospital, are placed on the same ward with psychotic patients. A separate unit, where they could be individually treated, would be a useful step forward.

Many patients seen in the venereal clinics suffer from neurosyphilis and would benefit from more expert therapy for this condition, including fever therapy. Unfortunately the early cases showing no mental symptoms are at a disadvantage because the patients are unable to receive treatment at the State Hospital until they are actually considered insane. It is hoped that some arrangement can be made whereby all indigent patients with neurosyphilis can receive additional treatment at the State Hospital in the early stages, when they would benefit from it most.

The extramural activities of the hospital deserve high praise and support. Clinics are now held by members of the staff in Concord, Manchester, Nashua, Dover and Portsmouth. This gives the local physicians the benefit of expert advice on their problems, and it is to be hoped that a large number of physicians will take advantage of this opportunity.

THE STATE SCHOOL

Although all physicians have long recognized that there is a difference between insanity and feeble-mindedness, no special provision was made for the care of the latter until 1903, such cases having been cared for in the county institutions and the State Hospital. Strange as it may seem, the Laconia State School was definitely instituted by a petition to the legislature from the women's clubs of the State of New Hampshire. The act creating the school was passed in May, 1901, and the school was formally opened in February, 1903. During the first year there were admitted 71 persons, all that the institution was capable of caring for at that time. The original group of farm buildings, still in use, has been added to and improved. In addition, a number of new buildings have been constructed, including dormitories, a grammar school, a service building and a new, fireproof infirmary with facilities for the care of an accumulating number of infirm and bedridden children. The infirmary also contains a laboratory, rooms for dentistry and for clinical examinations, an operating room for minor surgery and drug storage space. The present census is 621 persons, of these 436 are helpful, to a lesser or greater extent, and can do some kind of work, either in the buildings or on the farm. Also under the jurisdiction of the school are 92 persons on parole.

In the grammar school there are 150 boys and girls under specially trained teachers. Academic

instruction is seldom carried beyond the age of seventeen, but in the arts and crafts and manual training departments some of the older pupils carry on further educational training. The results obtained through the untiring efforts and patience of the superintendent and his staff with these handicapped individuals are very impressive. This is especially marked in the Manual Arts Department.

Here are more than 600 unfortunates in an institution, and probably as many more throughout the State, although no census has ever been taken and no provision made for reporting this condition. This makes one wonder whether many of the conditions with which the patients are afflicted could not have been prevented or alleviated. We as physicians recognize that mental deficiency has as a basis brain lesions of an anatomical, chemical, electrical or physiological nature, either of the immediate past or perhaps remote and due to ancestral disease. This gives us a clue to some probable preventive measures such as the better practice of obstetrics in order to prevent cerebral hemorrhage or other brain injuries, the premarital blood-test law recently enacted, which should do much to obviate congenital syphilis, and the sterilization law. A paper by Baker¹ contains the following statement:

The legal sterilizing process in New Hampshire requires forty-four days of legal procedure before an operation can be done. It requires the appointment of a guardian for the occasion by the probate court whenever a competent natural guardian is wanting, complete fourteen days service of notice and a hearing before the trustees or commissioners. This law has three outstanding requirements:

1. Legal sterilizing operations can be done only on inmates of state and county institutions.
2. The person subject to a legal sterilizing operation must be insane, feeble-minded or epileptic.
3. In the words of the law the person must be found to be "a probable, potential parent of socially inadequate offspring likewise afflicted."

These measures, together with the newer methods of placing and treating babies and young children, will no doubt do much to lessen the number of these cases in the future.

SANATORIUMS

Throughout the years, physicians have led the way and pleaded for adequate sanatorium treatment for tuberculous patients in New Hampshire. None know better than they that the cost of treating this disease is high—far beyond the means of the average family—and that a considerable period of time is required in order to effect a cure. We have two sanatoriums in New

Hampshire—one state-owned and operated, at Glencliff, and the other private, at Pembroke.

The Glencliff Sanatorium is 1650 feet above sea level, the legislative act having required that the institution be established at not less than this altitude, since many specialists at that time believed that high altitude had a favorable tendency toward the cure of the disease. The institution originally consisted of an administration building and two cottage wards for patients. Both these wards were open to the south as fresh air was also considered of great importance in the cure of the disease. Thirty beds were available for patients.

Since the opening of the Glencliff Sanatorium in 1909, the growth and development of the establishment have been phenomenal. At the present time it is rated as one of the leading institutions of its kind in the country. Additions to the cottage wards have been made, so that the excessive amount of fresh air has been mitigated as is especially necessary in the extreme cold of a New Hampshire winter in the "North Country." An infirmary building with individual rooms for patients more in keeping with modern methods of treatment of the disease, was added in 1935, and several years ago an addition increased the capacity of the building to approximately 90 beds. A heating plant, tunnels between the buildings, lighting of the roads, grading of the grounds, the addition of a recreation building and other improvements have greatly aided in making Glencliff meet the requirements of a modern sanatorium.

The infirmary building contains an excellent operating room, and facilities for pneumothorax and some other forms of chest surgery, such as pneumolysis and phrenicectomy. The more serious operations in chest surgery such as thoracoplasty, are performed at the New England Deaconess Hospital in Boston by Dr. Richard H. Overholt, or at the Mary Hitchcock Memorial Hospital at Hanover, New Hampshire, by Dr. Dawson Tyson.

The sanatorium at Glencliff has approximately 140 beds at the present time. The policy of the institution is to restrict admissions to a class of cases designated as "favorable," such as first-stage and second-stage patients not carrying persistent temperatures, and cases without complications.

Application for admission to the New Hampshire State Sanatorium is made to Dr. Robert M. Deming. Any physician may write or telephone for an application blank. On receipt of the application Dr. Deming may request an x-ray film of the patient's chest. After study of the facts rela-

tive to the stage of the disease and the prognosis, the superintendent may accept the case. If rejected because of an unfavorable outlook, the case is referred to the State Board of Public Welfare for admission to the Pembroke Sanatorium.

In 1911, recognizing the principle that advanced cases should be treated in institutions readily accessible to relatives and friends, the State of New Hampshire inaugurated the policy of providing a subsidizing appropriation for the treatment of advanced cases of tuberculosis and for the encouragement of the establishment of institutions for their care. Under this appropriation only the cost of maintenance of beds is provided, and the advanced-case work has been carried on at the Pembroke Sanatorium.

This institution, one of the oldest sanatoriums in the country, established in 1900, is located at an elevation of 650 feet—high on the crest of the Pembroke hills—in the town of Pembroke. Being thirteen miles north of Manchester and five miles south of Concord, it is near the center of population of nearly 75 per cent of the State.

Consisting in the early days of an administration building and three camps for approximately 20 patients, the institution has now grown to a 100-bed capacity. With the beginning of the state work, the camp idea has been gradually abandoned and frequent additions have been made to the administration building. The facilities now available provide hospital rooms for each patient. All the buildings are protected against fire by a sprinkler system and other devices. All modern facilities for diagnosis and treatment are now available, with an x-ray department and an operating room for pneumothorax, pneumolysis and similar operations. As is the procedure at Glencliff, thoracoplasty cases are sent to the New England Deaconess Hospital or the Mary Hitchcock Memorial Hospital.

The State's work for tuberculous children has been developed at the Pembroke Sanatorium. Excellent facilities are available for boys and girls. A school is maintained on the sanatorium grounds, and the curriculum and program are carried out in accordance with the requirements of the State Board of Education.

All the patients at the two sanatoriums are state beneficiaries, some paying part of the cost of treatment. The State Department of Public Welfare passes on the admissibility of patients as state beneficiaries, the State assuming entire or partial expense as the financial status of the patient and his family warrants. For the most part, patients are given full state aid.

Many physicians refer their patients to the clinics now so advantageously located through-

out the State and maintained under the auspices of the New Hampshire Tuberculosis Association. These clinics assume the responsibility of making an application for admission of patients to Glencliff or Pembroke, as the findings warrant.

The efficacy of the treatment of tuberculosis in the State of New Hampshire can be readily seen by comparing the death rate of 150 per 100,000 in 1910 with that of 38 in 1935. This was the lowest of any of the New England states and about 20 units lower than the country as a whole. This good showing can be bettered by an increased effort to detect the disease in childhood, which can be accomplished by skin tests, x-ray photography and careful physical examinations.

STATE BOARD OF HEALTH

Probably the most far-reaching of any of our public-health organizations is our State Board of Health. This is composed of six members. The governor and attorney general are ex-officio members, and in addition the law provides that there shall be three physicians and one civil engineer, two of the latter four appointed biennially by the governor, with the advice and consent of his council, to serve for terms of four years. The last legislature added one more lay member. The administrative head is a physician trained in public-health work, who acts as secretary, and is also, by law, the registrar of vital statistics and the state pathologist. Under him function the following departments:

Department of Vital Statistics. This office does the tabulating, recording and preserving of all vital-statistics material. This work has been greatly increased since the passing of the Social Security Act. In 1934, there were only 1432 inquiries, as compared with 3025 in 1938.

Department of Venereal Disease Control. This department operates six clinics, situated in Manchester, Dover, Nashua, Portsmouth, Concord and Berlin. These clinics care for patients who are financially unable to be treated by private physicians. The division supplies private physicians with medication for the treatment of syphilis. During 1938 there were distributed 9201 doses of arsenicals and 9441 doses of bismuth.

Division of Maternal and Child Health. The director of the division is a physician. Its activities are as follows: the organization and maintenance of child-health conferences, where approximately 500 babies are seen each year, the maintenance of three prenatal clinics, serving about 1200 mothers, the distribution of educational literature, the employment of a full-time nutritionist, who gives advice to other state depart-

ments, local relief agencies, nursing organizations and lay groups. The director carries on an annual study of maternal deaths and stillbirths trying to determine their cause and the means of reducing them. This is done in conjunction with the New Hampshire Medical Society and the director acts as the go-between for the Society and the doctors. Through this co-operation it is hoped that there will be a better practice of obstetrics. The division also licenses all maternity hospitals and homes, of which there are about 150 in the state.

Division of Crippled Children's Services This division provides for the registration hospital care, furnishing of appliances and aftercare services—including nursing and physiotherapy—to crippled children under the age of twenty-one. It also supervises clinics in Manchester, Nashua, Concord, Keene, Peterborough, Laconia and Littleton. Approximately 350 crippled children are aided during the year.

Division of Epidemiology This division has charge of the communicable-disease-control work of the Board of Health. An exception is made in the tuberculosis work which is carried on mainly by Dr Robert B. Kerr, under the direction of the New Hampshire Tuberculosis Association. Dr Kerr co-operates closely with the State Board of Health.

Division of Chemistry and Sanitation The chief activity of this department is supervision of the food and drug supply and general sanitary conditions of the entire State. The division consists of a director, a staff of chemists and a bacteriologist who perform the laboratory analyses, and a staff of sanitary engineers and sanitarians who carry on the field work in sanitation. The duties of the laboratory include the chemical and bacteriological examination of drinking water and the analysis of milk, foods, drugs, cosmetics, liquor and such other materials as may affect the public health. The field work consists of supervision and control of public water and sewage systems and of milk supplies including dairies and pasteurization plants. Regular inspections are made of grocery stores, drugstores, restaurants, hotels, overnight camps, tourist places, juvenile camps, lumber camps and many other establishments which serve food and offer lodging to the public. It also has licensing and regulatory control over many of these activities. The industrial hygiene unit of this division is prepared to give technical service and advice to industrial plants in the control and prevention of occupational diseases.

Division of Public Health Nursing This department employs thirteen regular public health nurses doing full time work, three substitutes and nine WPA nurses. It co-operates with all divisions of the Board of Health where nursing services are required.

Division of Bacteriology, Serology and Pathology It is probably with this division that physicians are best acquainted, and I am sure that we all appreciate the co-operation and help which it gives us. The main laboratory is situated in the State House in Concord and a branch is maintained at the Dartmouth Medical School at Hanover. Both are equipped and staffed to perform all standard bacteriological and serological procedures, and the laboratory at Hanover does the pathological work for the department. Since the blood test law has been in operation there has been a tremendous increase in the volume of serological work. The department is always ready to inaugurate new procedures that will be of service to the physician. Appreciating the value of serum treatment in certain types of pneumonia, it has added the service of typing sputums and furnishing serum where indicated. In order to obtain the best results, the members of the department ask that physicians take the sputum as early as possible in the course of the disease, give a history of the case and report on the results of the treatment. The laboratory gives twenty-four hour service in pneumonia typing. This is a distinct advantage, as the efficacy of serum treatment is dependent on early administration.

During the year ended March 31, 1939, a total number of 81,261 tests were carried out. I am sure you will agree that this is a vast amount of work, and it goes to show the confidence that physicians have in the State Laboratory.

MISCELLANEOUS

There are a number of other agencies concerned in public health work in New Hampshire. Notable among these are the State Board of Education, the Department of Public Welfare, the Cancer Commission and many licensing boards and extension services.

* * *

All these activities, with their ramifications, show the necessity of some means of co-ordinating these independent agencies. Logical suggestions and possibilities have been very clearly outlined in the survey, *The Administration of Public Health in New Hampshire*,² published by the New Hampshire Foundation.

The New Hampshire Medical Society represents

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topic gestation, in cases of hydatid mole and in cases of chorionepithelioma, both in men and in women. It is the material which gives the positive tests for pregnancy. Although commonly referred to as anterior pituitary like substance, or A.P.L., its proper appellation is chorionic gonadotropin. It is inactive on oral administration, and can be given safely only by the intramuscular route.

The functions of chorionic gonadotropin in human pregnancy are not clearly known, but its rapid appearance in the blood and urine following implantation of the ovum is assumed to result in the inhibition of menstruation, either directly or through stimulation of the corpus luteum of pregnancy. Because it is a potent stimulator of corpora lutea experimentally, and because its appearance coincides with failure to menstruate and with the development and persistence of the corpus luteum of pregnancy, we naturally believe that it ought to have therapeutic value in stopping functional flowing and in stimulating luteinization. Presumably in sufficient dosage it would accomplish both these aims, but the material has not been chemically identified and the available preparations are neither pure nor really potent. There is at present no proof that these preparations, in the amounts given stimulate or enhance luteinization in women's ovaries or even produce follicle ripening as they do experimentally. There is, however, considerable clinical support for their value in inhibiting truly functional uterine bleeding, although not consistently in the amounts injected. The mechanism of this inhibition is unknown. Until recently no standard of assay for chorionic gonadotropin had been adopted universally, so that what one manufacturer labeled as 100 rat units might have been less or more than 100 rat units according to the standard of another concern. Considering the large amounts of this hormone in the blood and urine of pregnant women, it is only logical that large amounts must be administered to obtain clinical results. This hormone is worth a trial, then, in otherwise recalcitrant true functional flowing.

Estrogenic substances are covered by various terms such as female sex hormone, ovarian hormone. Folliculin, estrin and Menformon. They are derived from urine of pregnant women, human placentas and pregnant mares' urine. The difficulty in naming estrogenic substances is apparent, for there are three of them: the so-called native estrogens, and they have a number of functions. The names of these, estrone, estriol and estradiol, connote only one of their functions, that is, the ability to produce an objective sign of estrus,

namely desquamation of cornified cells from the vaginal mucous membrane. The structure of these hormones and their chemical interrelations have been well established. So far as we now know, they all are similar as regards their physiological properties, although they differ in estrogenic potency. In experimental work the estrogens have been found to have many interesting effects, but their roles in normal and pathologic states in women are only now beginning to be exposed. In adequate dosage they are effective both when taken by mouth and when injected intramuscularly, usually in solution in vegetable oil. By mouth five to ten times as much is necessary as by injection. The estrogens in any of the amounts thus far given to human beings are apparently harmless. This is not surprising considering the enormous quantities elaborated in the body, especially during the latter months of pregnancy.

Let us review some of the actions of the estrogens. Menstruation has been prevented by the administration of tremendous amounts. Presumably, functional flowing could also be stopped in this way. It would be a costly therapy, and on theoretical grounds might be harmful. The giving of estrogen to animals under certain conditions results in enhancement and persistence of their corpora lutea with prolonged progesterin effects. On this basis the administration of estrogen to women at the time of ovulation and luteinization ought to foster a better progesterin effect. This is one reason for prescribing estrogen for sterile women, together with the performance of other maneuvers. Right from the start of pregnancy in women there is marked and progressive increase in estrogen production, apparently first by the ovary and then by the placenta. So we think of estrogen as involved in the stimulation and enhancement of progesterin, which is so important for preparing the ovum's implantation site and for the maintenance of pregnancy.

The estrogens are necessary for proliferation of the endometrium, and progesterin, in turn, cannot act satisfactorily unless the endometrium has been prepared by estrogens—nor can progesterin continue to be effective without estrogens.

As regards lactation, the breasts will not respond fully to the lactogenic hormone of the pituitary gland unless estrogens and progesterin have played a part in their preparation. On the other hand, lactation will not take place if there is too much circulating estrogen, as in cases with retained functioning placental tissue, which probably secretes the tremendous amounts of estrogen found in pregnancy. Therefore, in order to prevent lactation the administration of much estrogen may be

undertaken in conjunction with but not to the exclusion of the usual simple measures

Sore breasts before menstruation are thought to be associated with some imbalance of the pituitary and ovarian hormones that affect the breasts. The condition has not yet been explained, though empirically estrogens often provide relief. Some patients with unmistakable cystic disease of the breasts, especially if there is associated pain, seem to be benefited by prolonged ingestion of estrogen, but there is as yet no clear indication for such therapy, and relief thereby cannot be confidently anticipated in any given case. Our knowledge of the etiology of cystic disease is still too hazy.

Estrogens are necessary for the growth and activities of the uterus, tubes and cervix. They play a large part in the pelvic blood supply, as evidenced by the vascular hypertrophy of pregnancy on the one hand and the atrophy of castration on the other—and these vascular effects include the vagina and vulva. In addition, the estrogens have a direct influence on the epithelium and underlying tissues of the vagina and vulva, causing the epithelium to thicken and the underlying tissues to become more elastic. Hence the rationale of estrogen therapy in vaginitis, both prepubertal and senile, in conditions associated with vulval atrophy, such as kraurosis and leukoplakia, in genital hypoplasia and in conditions, such as amenorrhea and sterility, where an increase of these effects seems desirable.

Progesterin, a secretion of the corpus luteum and of the placenta, is chemically not very different from the estrogens and is rather closely related to the male hormones. Interestingly enough, some of its actions can be duplicated with male hormones. Progesterin for clinical use is synthesized under the name of progesterone. Progesterin, of course, is necessary for the proper preparation of the endometrium for nidation of the fertilized egg and for the development of the decidua, in fact, it appears to be necessary throughout the whole of pregnancy. This substance can inhibit menstruation, and stops functional flowing if given in large enough amounts, but it is still costly to make and much more costly to buy. There seems to be no clear indication for it in the treatment of essential dysmenorrhea, especially since this type of dysmenorrhea characteristically occurs in patients who ovulate and have corpus luteum activity. Since progesterin is so important in pregnancy, one thinks of it in connection with habitual abortion and threatened miscarriage or premature labor, and it certainly rates a trial in these conditions, but not in homeopathic doses. If, in adequate dosage, it fails to prevent abortion, we must remember that a large percentage of spontaneous

abortions are sequelae of blighted ova. Miscarriage or premature labor, of course, may be due to other known and unknown causes in addition to possible lack of progesterin. This hormone must be injected intramuscularly. With the quantities thus far tried, no sign of toxicity has ensued.

Before proceeding with considerations of possible practical uses of the hormones in specific clinical situations, I should like to pass judgment on the hormone tests. In the first place, as I see it, the chief value of the pregnancy tests (for the presence of chorionic gonadotropin) lies in helping to make the diagnosis of chorionepithelioma, and in detecting its early recurrence. As regards normal pregnancy, these tests simply confirm one's suspicions a little earlier than otherwise, and thereby allay the suspense of waiting until the diagnosis is obvious. In the differential diagnosis and treatment of ectopic gestation one must be guided by clinical judgment. In cases with disease contraindicating gestation the diagnosis becomes apparent in ample time for proper measures. Unorthodox and provocative as the statement may seem offhand, I know of no instance in which a pregnancy test was absolutely necessary for the proper clinical management of a case—with the exception of mole or chorionepithelioma. Furthermore, tests for the pituitary gonadotropic factor in human urine, by the methods available and in the present state of our knowledge, are in our experience of no clinical value. Finally, tests for estrogenic substances are still in the realm of research. Since the normal levels of urinary estrogens vary over wide limits throughout normal cycles, repeated specimens over a period of at least one month must be analyzed in order to secure any information about an individual case. Methods of analysis have not been standardized. They are expensive and time-consuming. There is no specific chemical reagent that can measure the estrogens with any degree of accuracy, and bioassay, in order to give dependable results, requires a large number of animals. For these reasons, tests for estrogens are of no practical value to the clinician attempting to diagnose a case. The best test for the presence of the corpus luteum hormone in the non-pregnant woman is to obtain by suction curet a biopsy of the endometrium before menstruation. If it shows a secretory, that is, a progestational, endometrium, this is definite evidence of the presence of progesterin. Progesterin is not excreted in the urine as such, it is found there in the form of pregnandiol, and in such small amounts in the non-pregnant that the test for it is really only qualitative and hence gives no more information than does a biopsy.

Thus, although investigation of the blood content and urinary excretion of these hormones and their metabolic products is slowly increasing our knowledge and understanding it is a waste of money to have any but the pregnancy test done as a clinical procedure. I myself believe this is performed too often to confirm already suspected normal pregnancies, and too infrequently on patients who are candidates for chorionepithelioma to facilitate the diagnosis for which repeated quantitative assays on blood serum are even more preferable.

CLINICAL CONSIDERATIONS

There is no hormone therapy for the "bearded lady." It is usually impossible to find the cause of abnormal hair growth much less to stop or cure it. When it is part of an adrenal or ovarian tumor syndrome, that is another story.

There is no female sex hormone therapy for obesity but at this word our thoughts turn to metabolism, thyroid therapy and diets, and this triad it seems to me, is still the backbone and mainstay of the treatment of functional disorders in the female. Obese patients, and those with amenorrhea, dysmenorrhea, profuse menstruation or prolonged flowing of functional origin and sterile women, in the absence of any obvious pathologic condition, deserve a metabolic study, the giving of thyroid preparations on the slightest indication, and a careful revision of the diet.

Sexual frigidity may have such a complex background that a definite place for hormones in its treatment is difficult to determine. A few patients of mine, while taking 200 to 600 rat units of estrogen daily by mouth, have spontaneously volunteered the information that sex activity was more satisfactory.

Amenorrhea, in the absence of demonstrable constitutional disease and of any desire for pregnancy is not in itself an indication for any attempts at treatment beyond the possible giving of thyroid and a complete diet. It is sometimes possible to produce a sort of menstruation by the proper and costly, amounts of estrogen and progestin, but this is valueless without ovulation. When primary amenorrhea is complicated by sterility the problem is at present practically insurmountable. When secondary or acquired amenorrhea is complicated by sterility an occasional success is achieved, but not by sex hormone therapy although this may be considered a supplementary aid. In simple amenorrhea either primary or acquired, we do not usually know where to lay the blame—on the pituitary gland, ovaries, endometrium, blood vessels, nervous system or general imbalance. I know of no labora-

tory procedures that provide a reliable means of differentiating the causes of amenorrhea. Reports are appearing rather frequently on the value of small doses of x radiation to the ovaries in amenorrhea, the rationale being to inactivate completely for a short while such ovarian function as there may be, in the hope that the return of function will be exaggerated to the point of normalcy. The role of inadequate diet in the production of acquired amenorrhea is perhaps too often overlooked. Menstruation may recur within a year on a carefully planned, complete diet. In addition to diet, thyroid and possibly x radiation it seems worth while to prescribe at least 500 rat units of estrogen by mouth daily with the idea of stimulating the whole genital apparatus.

As to sterility, once tubal patency is established by insufflation the condition of the cervix and vagina rendered satisfactory the occurrence of ovulation indicated by a secretory endometrium on biopsy late in the menstrual cycle and the semen found adequate, sterile or infertile couples seem to be helped more by the mechanical procedures of insufflation or endocervical irritation following intercourse between eight and fifteen days after the start of menstruation than by any hormone administration. Beyond the giving of dietary instructions and thyroid I make it a routine to prescribe 200 to 400 rat units of any sort of estrogen by mouth daily for the woman for months. The rationale for such estrogen therapy lies in the possibility of enhancing the influence of the ovarian hormones on the whole genital tract. This measure has seemed in quite a few patients, to have played a role in achieving the desired result.

For the treatment of essential dysmenorrhea the administration of any of the sex hormones has no proved physiological rationale and cannot be counted upon for any effect. This disability can be so favorably influenced by so many empirical procedures—general health measures, antispasmodics, sedatives, heat, dilatation of the cervix and so forth—that in the ordinary case it seems unwise to resort to hormonal therapy until more information is available. However, I do not wish to go on record as decrying completely the use of hormones for essential dysmenorrhea. After all patients have experienced relief from the premenstrual or early menstrual administration of chorionic gonadotropin, or of large amounts of estrogen or of moderate doses of progestin or from the injection of large amounts of estrogen earlier in the cycle or from the daily ingestion of estrogen throughout the cycle. Such results cannot be entirely a matter of coincidence since these hormones are so causally involved in endometrial

UREMIA FOLLOWING X-RAY THERAPY IN LEUKEMIA*

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THE rarity with which uremia is mentioned in the literature as complicating the x-ray treatment of leukemia prompts the reporting of 3 such cases, seen during the last five years

From 1927 to 1939, 40 cases of leukemia, myeloid, lymphatic or monocytic, were treated at the Pondville Hospital. In 18 of these death occurred at the hospital or within twenty-four hours after leaving it. Three of the latter cases, which were associated with uremia and occurred shortly after the administration of x-ray therapy, form the basis of this report.

As early as 1870 Salkowski¹ demonstrated an increased output of uric acid in the urine of a patient with "splenic leukemia." This finding has been confirmed by many later authors. Magnus-Levy, Pribram and Rotky, Brugsch and Schittenhelm (quoted by Jugenburg and Tschotschia²). Studies following x-ray therapy have shown a still further increase in uric acid excretion, as noted by Musser and Edsall,³ Lossen and Morawitz and others (quoted by Jugenburg and Tschotschia²), Joel⁴ and Bedrna and Polcak.⁵ The occurrence of gout as a result of hyperuricemia in leukemia was reported as a rare complication by Brugsch and Schittenhelm in 1908 (quoted by Jugenburg and Tschotschia²).

Bedrna and Polcak⁵ have reported 2 cases of leukemia (1 myeloid and 1 lymphatic) which within a few days of x-ray therapy developed ureteral obstruction from uric acid calculi. The calculi were passed following ureteral catheterization and the patients left the hospital a few days later, benefited by their x-ray treatment.

Jugenburg and Tschotschia² in a most interesting paper, published in 1931, reported some detailed studies of the uric acid metabolism in cases of leukemia undergoing x-ray treatment. A translation of their conclusions is as follows:

The state of the purine metabolism is a measure of the clinical severity of the leukemia.

Increasing blood uric acid can be caused either by increasing destruction of nuclei of white cells or diminished excretion because of renal insufficiency.

In cases responding favorably to x-ray there is an increased urinary output and a normal blood level of uric acid at the end of treatment.

In fatal cases of leukemia severe changes in the kidneys can be demonstrated. These changes are partly of a de-

generative nature and partly leukemic infiltrations of either myeloid or lymphatic cells.

In fatal cases of leukemia there is always diminished excretion of uric acid and accumulation of the same in the blood. [This would hardly seem to apply to cases dying of sepsis without elevation of the nonprotein nitrogen.]

The determination of the uric acid quotient [a figure obtained by dividing the blood uric acid in milligrams per 100 cc. by the twenty-four-hour urinary uric acid output in grams] is just as important as the examination of the peripheral blood during x-ray treatment.

A significant increase of the uric acid quotient shows the approach of menacing intoxication.

In the treatment of leukemia one must take great care to relieve the organism as much as possible from endogenous and exogenous uric acid. Therefore the diet should be as low as possible in purines and x-ray should be given in small doses.

Every case of leukemia should be regarded as having more or less renal insufficiency.

In their paper Jugenburg and Tschotschia cite 4 cases with falling uric acid quotients associated with good responses to x-ray therapy, and 4 cases with rising quotients and death occurring shortly after completion of the x-ray treatment. In 2 of their reported fatal cases the patients died with blood uric acid levels of 132 and 160 mg. per 100 cc., whereas the other 2 had levels of only 61 and 53 mg.

Nemenow,⁶ working in the same Leningrad clinic as Jugenburg and Tschotschia, applied their findings to the planning of x-ray therapy. From their demonstration of the importance of the functional efficiency of the kidneys in determining the response to x-ray treatment, he reasoned that it should be given in small doses at generous intervals in order to spare the kidneys as much as possible, and that it should first be applied directly to the kidneys, in order to remove leukemic infiltrations therein and thus increase their functional efficiency before loading them with uric acid from x-ray treatment applied over other bulky leukemic deposits, such as those in the spleen, lymph nodes and bone marrow.

Nemenow suggested treating the right kidney before the left because of the possibility of some effect on the spleen while radiating the left kidney. He used initial doses of 125 to 240 r. He reported 2 cases of myeloid leukemia treated in this way. The first had a blood uric acid content of 10 mg. per 100 cc. and a uric acid quotient of 188 at the beginning of treatment. The blood uric acid content was reduced to 4.8 mg. and

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the quotient to 4.4 after radiating the kidneys alone. The second case had a blood uric acid content of only 6.6 mg per 100 cc., but a quotient of 13, which was reduced to 3, with a corresponding reduction of the blood uric acid content to 4 mg. Both cases were markedly benefited by x-ray therapy.

The following case illustrates a fatal uremia following x-ray therapy for leukemia.

CASE 1 (P. H. No. 12941) A M., a 56-year-old man was referred to the hospital for x-ray treatment of myeloid leukemia on August 21, 1937. He gave a history of increasing weakness, pallor and a loss of 30 pounds of weight in 3 years; increasing dyspnea and verugo for 3 months and deafness for 2 weeks.

On physical examination the only significant findings were bilateral deafness and an enlarged spleen, extending from the left flank to the midline and from the costal margin to the umbilicus. The hemoglobin was 54 per cent (Sahli); the red-cell count 2,940,000 and the white-cell count 237,500. The differential count showed 71 per cent polymorphonuclears, 1 per cent lymphocytes, 2 per cent eosinophils, 5 per cent basophils, 12 per cent myelocytes, 6 per cent metamyelocytes and 3 per cent myeloblasts. The platelets were present in normal numbers in the smear and the red cells showed marked anisocytosis. The nonprotein nitrogen was 52 mg per 100 cc. The phenolsulfonphthalein excretion of the kidneys was 15 per cent in the 1st hour and 15 per cent in the 2nd, a total of 30 per cent in 2 hours.

The patient received 900 r of x-ray in divided doses applied to the spleen. The white-cell count had dropped to 15,000 at the time of his discharge a month later. The spleen became barely palpable, the verugo disappeared but the deafness was unaltered.

The patient returned to the hospital 9 months after his first admission because of discomfort in the region of the spleen. The latter extended 6 cm below the costal margin. The white-cell count was 341,200 and the hemoglobin 52 per cent. Another 900 r was delivered to the spleen in nine treatments and 900 r was also given on each side of the head in the hope that the deafness might be improved if caused by leukemic infiltration of the 8th nerves.

After 1 month in the hospital the patient was discharged with a white-cell count of 34,000 and a considerably smaller spleen but without any improvement of hearing. He returned again 5 months later (15 months after his first admission) because of pain in the left side and weakness. The spleen was again 6 cm below the costal margin and there was a coarse friction rub audible and palpable over it. The white-cell count was 269,000. The patient received 800 r applied to three different areas of the spleen. He was again discharged considerably improved after a month's stay with a white-cell count of 97,000, a hemoglobin of 47 per cent and a red-cell count of 2,340,000.

The patient re-entered the hospital for the fourth and last time 3 months later (19 months after his first admission) because of recurrence of pain in the left flank. The spleen extended below and to the right of his umbilicus and there was a friction rub over it, again both audible and palpable. The white-cell count was 210,000, the hemoglobin 60 per cent and the red-cell count 2,950,000. The blood nonprotein nitrogen was 47 mg per 100 cc.

X-ray treatment was repeated this time four treatments of 100 r each being applied to two portals 10 by 15 cm. over the front and back of the spleen on successive days.

The white-cell count dropped rapidly to 90,000 in the first 11 days after admission. Two weeks after entry the patient complained of burning on urination and vague abdominal pain and distention. Two days later he began to vomit and seemed a little drowsy. The white-cell count had dropped to 39,500, the hemoglobin to 57 per cent and the red-cell count to 2,910,000, but the nonprotein nitrogen had risen to 148 mg per 100 cc. and the phenol sulfonphthalein test showed no excretion of the dye in 2 hours. Six days later (3 weeks after admission) the white-cell count was 9400, the nonprotein nitrogen 151 mg per 100 cc., the creatinin 9.76 mg and the uric acid 12.3 mg. From this time on the patient's condition steadily became worse; the white-cell count continued to fall until 2 days before death (32 days after admission) when it was 3800 and the nonprotein nitrogen was 244 mg per 100 cc.

Autopsy. A postmortem examination showed the usual findings of chronic myeloid leukemia, but the kidneys were of unusual interest. The right kidney weighed 235 gm. The cut surface showed a cortex of normal width. The capsule stripped with ease, leaving a coarsely granular surface. In the calyces were moderate numbers of small, yellowish gray calculi. There was no obstruction of the ureter. The left kidney weighed 250 gm. In its upper pole was a cyst 7 cm. in diameter filled with clear fluid and having a smooth lining. On section the cortex measured up to 8 mm. in thickness. Scattered throughout the cortex and medulla were many small gray foci on a yellowish-pink background. The capsule stripped easily leaving a coarsely granular surface. The calyces were packed with gravel-like calculi having a yellowish gray color. In the two major calyces were larger stones measuring 2 by 1 by 1 cm. Their surfaces were smooth. Chemical tests showed these calculi to be composed of uric acid and urates. The first portion of the left ureter was packed with gravel-like calculi; the remainder of it was normal.

Microscopic examination showed an occasional small cortical scar in the left kidney containing atrophic tubules and rare hyalinized glomeruli. Scattered collecting tubules in the cortex and medulla contained a finely and coarsely granular basophilic material. The epithelium of some of these tubules was degenerated. In the right kidney were multiple foci of necrosis in the cortex and medulla having the appearance of that of an ascending infection. The foci were heavily infiltrated by polymorphonuclears and often contained fibrin and large clumps of bacteria. Near-by tubules and stroma contained polymorphonuclears. There was slight intimal thickening and hyalinization.

It is possible that this patient's uremia was precipitated by x-ray therapy. However it is interesting that on three previous occasions he had tolerated larger amounts of x-ray delivered to the spleen with gratifying clinical improvement even though he gave laboratory evidence on his first admission of definitely impaired kidney function.

The following cases are not so striking as the first but are reported as representing possible examples of renal insufficiency accentuated by x-ray treatment of leukemia.

CASE 2 (P. H. No. 7539) J. D., a 51-year-old woman, was sent to the hospital on March 3, 1934 with a diagnosis of malignant melanoma of the leg. Six years previously she had first noticed a small "pimple" on her left leg.

This had grown slowly and bled frequently after slight trauma. A doctor had advised its removal a year before admission, but she had refused. Following tonsillitis 3 weeks before entry she noticed some small lymph nodes in the neck. One week later she was seen in a tumor clinic and referred to the hospital with a diagnosis of melanoma. The past history included a radium-induced menopause for menorrhagia 4 years prior to entry.

On physical examination the patient appeared fairly healthy, but there were many small, discrete, relatively soft, freely movable lymph nodes in both sides of the neck, in both axillae and in both groins. These varied from 0.2 to 2 cm in diameter. The spleen filled the entire left flank and descended below the umbilicus. The liver was not felt. There was a mass deep in the right flank which felt like a large kidney. A small, pedunculated, dark-red, vascular tumor about 2 cm in its longest diameter was attached to the skin of the left shin.

The hemoglobin was 66 per cent (Sahlb). The red-cell count was 3,390,000, and the white-cell count 191,000, with 95 per cent mature lymphocytes. A blood Hinton test was negative, and the nonprotein nitrogen was 437 mg per 100 cc. The urine was acid, had a specific gravity of 1.024 and showed a trace of albumin. The sediment showed 15 white cells per high power field.

Diagnoses of chronic lymphatic leukemia and an unclassified papillary tumor of the left lower leg were made.

The patient was given 600 r of x-ray in six treatments, applied to the spleen, three anteriorly and three posteriorly, in 3 days. One hour after the first treatment nausea and vomiting began and lasted for 2 days. Three days later there occurred a transient episode of severe pain in the right flank, associated with localized spasm and tenderness lasting for 2 hours. The white-cell count was 65,000. Three days later the patient had a severe nosebleed, and the following day the white-cell count was 34,500. She felt better, though still a little nauseated and somewhat bothered with burning on urination.

Nine days after the first x-ray treatment there was an attack of severe pain in the left flank, which was thought to be due to a perisplenitis. The urine, however, showed large amounts of albumin and both red and white cells in the sediment. Four days later the white-cell count was 17,900 and the spleen was much smaller although still reaching almost to the umbilicus, but the patient was nauseated and quite drowsy. The next day the nonprotein nitrogen was 204 mg per 100 cc. and the patient was obviously in uremic coma. She died the following day, 15 days after the institution of x-ray therapy.

Autopsy was refused, but a postmortem biopsy of the tumor on the leg was done. This showed the skin heavily infiltrated with newly formed blood vessels, masses of lymphocytes, a few lymphoblasts and some connective tissue. There were many foci of hemorrhage and heavy deposits of golden-brown pigment. A diagnosis of lymphatic leukemia was made.

It seems possible in retrospect that the episodes of severe pain in the flank, first on the right and then on the left, associated with large numbers of white and red cells in the urinary sediment, may have been due to ureteral calculi. It is also possible that x-ray treatment hastened this patient's death, although there was definite evidence of renal impairment before x-ray treatment had begun.

CASE 3 (P H No 11306) E. M. S. P., a 65-year-old woman, was sent to the hospital because of a large spleen on August 13, 1936. She gave a vague history of weakness, a loss of 75 pounds and a lump in her left side for several years and easy bruising and profuse nosebleeds for 1 month. She also had had a lump in her left breast for 8 years, which had been ulcerated for 4 months.

On physical examination the patient was obviously emaciated and chronically ill. In the left breast was a small, hard, nodular, ulcerated mass 3 cm. in diameter, and there was a hard lymph node 2 cm. in diameter in the left axilla. The abdomen was relaxed and the entire left side was filled by a huge spleen extending into the pelvis. The liver edge was felt 4 cm. below the right costal margin. The hemoglobin was 30 per cent (Sahlb), the red-cell count 2,000,000, and the white-cell count 380,000. The differential count showed 60 per cent polymorphonuclears, 5 per cent eosinophils, 2 per cent basophils, 26 per cent myelocytes and 7 per cent myeloblasts. The basal metabolic rate was +39 per cent. A blood Hinton test was negative, and the blood nonprotein nitrogen was 65 mg per 100 cc. The urine showed an acid reaction, a specific gravity of 1.016 and a trace of albumin, the sediment contained 30 white cells and 4 red cells per high power field.

A diagnosis of chronic myeloid leukemia was made, and the question of carcinoma of the left breast was raised. X-ray treatment to the spleen was begun on the day after entry and 100 r was given daily for 4 days. One week after admission the white-cell count was 106,000, but the nonprotein nitrogen had risen to 71 mg per 100 cc. The blood urea nitrogen was 12 mg per 100 cc., the uric acid 273 mg, and the aminoacids 118 mg. Five days later the patient was nauseated and vomiting. Two days later (2 weeks after admission) she was in definite uremia with a nonprotein nitrogen of 147 mg per 100 cc. The white-cell count had dropped to 84,000. The urine showed an acid reaction, a specific gravity of 1.013 and a trace of albumin. The sediment showed 15 white cells and 20 red cells per high power field. Four days later the nonprotein nitrogen had risen to 188 mg per 100 cc. and the white-cell count had fallen to 49,000. Two days later the white-cell count was only 25,100 and the tip of the spleen was just above the umbilicus. The patient was moribund, however, and died the following day, exactly 20 days after the beginning of x-ray therapy.

Autopsy. Postmortem examination, in addition to the characteristic findings of chronic myeloid leukemia, showed a carcinoma simplex of the left breast, with metastases to the axillary nodes. The kidneys showed some grayish white, inspissated material in the right kidney pelvis, and microscopically there were foci of lymphocytic infiltration, hyalinized glomeruli and atrophied tubules. The large vessels showed subintimal thickening. About the pelvic fat in one section was a mass of loose connective tissue in which were collections of leukemic cells.

In retrospect this patient's death quite possibly was accelerated by x-ray therapy, although here too there was laboratory evidence of considerable renal impairment before x-ray treatment was begun.

DISCUSSION

It has been shown that x-ray treatment of leukemia, myeloid or lymphatic, results in an enor-

mous increase of uric acid production within the body which has to be excreted by the kidneys. This increased burden might conceivably precipitate clinical uremia if the kidneys were sufficiently damaged either by leukemic infiltrations or by non leukemic lesions. There is a real danger of the formation of uric acid stones anywhere along the genitourinary tract, which may further hamper the functional efficiency of the kidneys.

With the above facts in mind, the following therapeutic regime is suggested as a means of minimizing the danger of precipitating uremia or the formation of uric acid stones in leukemic patients undergoing x-ray therapy.

(1) Preliminary study of the blood levels of nonprotein nitrogen and uric acid and of the twenty four hour urinary excretion of uric acid before beginning x-ray treatment, and pyelographic and phenolsulfonephthalein excretion studies, if significant nitrogen retention exists.

(2) A low-purine diet and liberal quantities of fluid during x-ray treatment.

(3) Administration of alkalis by mouth in an attempt to keep the urinary reaction alkaline and hence lessen the danger of uric acid stone formation (Barney and Sulkowitch⁷ and Albright⁸).

(4) Administration of cinchophen prior to x-ray therapy in cases having an elevation of the blood uric acid, because of the known effect of cinchophen in increasing the excretion of uric acid by the kidney in cases of gout and leukemia.⁴

(5) Preliminary radiation of the kidneys according to the suggestion of Nemenow.⁶

(6) Blood uric acid and twenty four-hour urinary uric acid output determinations every three or four days during x-ray treatment, as a guide to increasing or decreasing the frequency of treatment.

(7) Treatment of extrarenal leukemic infiltrations by frequent x-ray exposures of small doses, spaced according to information obtained from the study of the uric acid metabolism and the blood counts.

CONCLUSIONS

Uremia is not a rare complication of the x-ray therapy of leukemia.

The number of leukemic patients dying with clinical uremia following x-ray treatment might be reduced by following a regime, as outlined, designed to spare the kidneys as much as possible from becoming overloaded with large amounts of uric acid and to avoid the attendant danger of either uremia or uric acid stone formation, or both.

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THE MASSACHUSETTS MEDICAL SOCIETY AND THE BRISTOL SOUTH DISTRICT MEDICAL SOCIETY*

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IN OBSERVING the centenary of the Bristol South District Medical Society, no more appropriate introduction could be offered by the speaker than the words used by Dr. Edward Reynolds in 1841:

We can hardly assemble on these short occasions without some mutual advantage. If they do not make us much wiser, they always make us happier, for we never separate without some kinder feelings and without acquiring some new interest in each other as well as in the noble cause to which we have consecrated our talents and our lives.

Since we have been on the brink of cataclysmic war for a year or more, we may find profit in reviewing some of the salient points in the stirring times which were successfully bridged by our ancestors. They survived, and so may we. Even Diogenes suffered from the vicissitudes of his time, about 400 B.C. In anticipation of his own death, he directed, "Bury me on my face." When asked why, he said, "Everything will soon be upside down, anyway."

So it is eminently fitting at this time that we should be looking back to the forgotten past, to review some of the great events which led up to the birth of the parent society, and later of this district society, and to gather riches from the memoirs of the great men who labored in laying the foundation of our cultural heritage.

From the settlement of the country in 1620 to the time when the Massachusetts Medical Society was organized in 1781, a period of more than one hundred and sixty years, no systematic effort whatever was made in New England to raise the standard of medical education, or to regulate the practice of medicine. A few able and highly respected physicians, educated chiefly in foreign countries, were to be found in the larger towns, but in general, the profession was in a state of extreme degradation.

A young man who, from choice, ill health or aversion to other pursuits, signified his wish to be initiated into "the arts and mysteries" of healing the sick, would first study Latin grammar with the parish minister as far as the first personal pronoun. Then he would apprentice himself to some

local practitioner for a few months, and, with this meager preparation, enter upon the discharge of his responsible duties. Thus was made the preacher-doctor, the highest type of which was exemplified by Cotton Tufts.

No examination was held, and no license given or required. A skeleton, in those days, was a rare acquisition, and a human dissection created as much consternation among the people as the appearance of a meteor. It was claimed that a knowledge of anatomy was of little importance to a physician, whatever might be the case with respect to the practice of surgery. Medical libraries did not exist, and the few eminent men educated abroad demanded 100 guineas from students, which surpassed the means of those who expected to practice for ninepence the visit. In the cities one shilling and sixpence, and later two shillings, was the customary fee for an ordinary visit.

The American Revolution opened a new field for medical investigation. Joseph Warren, a most conspicuous character of the period, was proposed as physician general, but, preferring a more active, hazardous employment, accepted a major general's commission, and in a few days sealed his principles with his blood at Bunker Hill.

Benjamin Church, a pupil of Joseph Pynchon, was appointed director of hospitals. He served with distinction, but while in office he was charged with treason, tried by court martial in Connecticut and found guilty. He was placed aboard a vessel headed for the West Indies. Nothing was ever heard of him thereafter.

It must be remembered that these were treacherous times. The patriots were virile, courageous men, but suspicious and just plain fighting mad. They brooked no opposition on the part of the native population, and sympathy for the British shown by any of their friends was a criminal offense. Many of the Tory sympathizers, like Edward Augustus Holyoke, were doctors who actually had an impartial attitude, but felt misgivings about the wisdom of undertaking a war against an enemy which was the most powerful nation on land and sea. Holyoke and eleven others suspected of pro-British sentiments were forced to publish a recantation of Toryism on May 30, 1775. Holyoke himself had to make a public declaration on Boston Common.

A discourse delivered at the centennial anniversary of the Bristol South District Medical Society, New Bedford, May 4, 1939.

†Surgeon, Truesdale Hospital, Fall River, Massachusetts.

The prudence and sagacity of Washington, which are as easily traced in the archives of science as in the cabinet or the field, instituted the first medical examinations in this state of candidates for practice.

Harvard Medical School was founded in 1770, on the bequest of Ezekiel Hersey. Three other donors were Abner Hersey, John Cummings and William Erving. The sum bequeathed was four thousand pounds. The medical department was not organized, however, until 1782.

During the Revolutionary War military hospitals afforded extensive opportunities for observations and experiments. Surgeons became familiar with important operations. Anatomy was greatly improved by the frequent unimpeded inspection of the organs of the human body. Physiology was better understood, and a spirit of inquiry assiduously cultivated.

One of the branch hospitals was located in Boston, with peculiar advantages to students in medicine. In 1780, the first course in anatomy was given with dissections and demonstrations by John Warren, surgeon of that establishment. Students of Harvard University were allowed to attend.

In 1780 the American Academy of Arts and Sciences was incorporated. Ten of the original number were of the medical faculty. David Cobb, Edward Augustus Holyoke, Ebenezer Hunt, Charles Jarvis, Joseph Orne, Theodore Parsons, Oliver Prescott, Micajah Sawyer, John Barnard and Cotton Tufts. The charter provided for the advancement of science and the useful arts, and the encouragement of medical discoveries.

In 1783, at Harvard Medical School John Warren was installed as professor of anatomy and surgery, Benjamin Waterhouse as professor of the theory and practice of physic, Aaron Dexter as professor of chemistry and materia medica. In 1809 John Collins Warren and John Gorham were chosen adjunct professors of anatomy and chemistry.

Let us pause a moment to review the activities of that small group of men who flourished during the War of the Rebellion. They were thoroughly familiar with the disorganized state of medical practice which had prevailed. Keenly aware of the necessity for organized effort to promote progress by association and mutual co-operation, they set about the task of establishing a society for this purpose.

The act of incorporation of the Massachusetts Medical Society was sponsored by thirty-one physicians. The preface was as follows:

As health is essentially necessary to the happiness of society, and as its preservation or recovery is closely

connected with the knowledge of the animal economy and of the properties and effects of medicines, and as the benefit of medical institutions formed on liberal principles, and encouraged by the patronage of the law is universally acknowledged

Be it therefore enacted by the Senate and House of Representatives in General Court assembled and by the authority of the same That Nathaniel Walter Appleton William Baylies Benjamin Curtis Samuel Danforth Aaron Dexter Shurley Erving John Frank, Joseph Gardner Samuel Holten Edward Augustus Holyoke Ebenezer Hunt Charles Jarvis Thomas Kist Cites Crouch Kellogg John Lynn James Lloyd Joseph Orne James Pecker Oliver Prescott Charles Pynchon Isaac Rand, Isaac Rand Jr Micajah Sawyer John Sprague Charles Stockbridge John Barnard Sweet Cotton Tufts John Warren Thomas Welsh Joseph Whipple and William Whiting be, and they hereby are formed into, constituted and made a body politic and corporate by the name of THE MASSACHUSETTS MEDICAL SOCIETY and that they and their successors, and such other persons as shall be elected in the manner here after mentioned shall be and continue a body politic and corporate by the same name forever.

And be it enacted by the authority aforesaid That the fellows of said society may from time to time elect a president, vice president and secretary with other officers as they shall judge necessary and convenient and they the fellows of said society shall have full power and authority from time to time to determine and establish the names number and duty of their several officers, and the tenure or estate they shall respectively have in their offices and also to authorize and empower their president or some other officer to administer such oaths to such officers as they the fellows of said society shall appoint and determine for the well ordering and good government of said society provided the same be not repugnant to the laws of this commonwealth.

And be it enacted by the authority aforesaid That the fellows of said society shall have one common seal and power to break, change and renew the same at their pleasure.

And be it enacted by the authority aforesaid That the fellows of said society may sue and be sued in all actions real personal or mixed and prosecute and defend the same unto final judgment and execution by the name of the Massachusetts Medical Society.

And be it enacted by the authority aforesaid That the fellows of said society may from time to time elect such persons to be fellows thereof as they shall judge proper and that they the fellows of said society shall have power to suspend expel or disfranchise any fellows of said society.

And be it enacted by the authority aforesaid That the fellows of said society shall have full power and authority to make and enact such rules and bylaws for the better government of said society as are not repugnant to the laws of this commonwealth and to annex reasonable fines and penalties to the breach of them not exceeding the sum of twenty pounds, to be sued for and recovered by said society and to their own use, in any court of record within this commonwealth proper to try the same and also to establish the time and manner of convening the fellows of said society and also to determine the number of fellows that shall be present to constitute a meeting of said

society, and also, that the number of said society, who are inhabitants of this commonwealth, shall not at any one time be more than seventy, nor less than ten, and that their meetings shall be held in the town of Boston, or such other place within this commonwealth as a majority of the members present in a legal meeting shall judge most fit and convenient.

In the Senate, November 1, 1781

This bill having had two several readings, passed to be enacted

SAMUEL ADAMS,
President

Approved by JOHN HANCOCK

Edward Augustus Holyoke was chosen as the first president of the Society. Four years later, in 1785, advisory committees were appointed for the ten different departments, of which Bristol was the ninth. In 1789, the Society drew up a plan of medical instruction requisite for candidates. The period of instruction was to be three years, with attendance on the practice of a respectable physician. The censors met for examining and licensing candidates for practice once in four months. The first licentiate was admitted in 1782.

The public estimation of this society was manifested in the constant patronage of the government. Its grant of a township of land to the Society demands our most respectful acknowledgment.

During the first ten years the operations of the Society were conducted with vigor. Toward the close of that period, however, unhappy personal alienations among some of the leading members existed, several of the most active of the founders had died or had become too infirm to take part in the meetings as formerly, and the Society languished. From 1794 to 1800 the treasurer was directed not to call on the fellows for the payment of their annual assessments.

In the beginning, the number of members was limited to seventy. After an interval of twenty years, however, it became evident that this limitation of membership was a distinct handicap. By an act of the legislature in 1803 the character of the Society was essentially changed. The number of fellows, originally limited to seventy, embraced all respectable practitioners in physic and surgery, and by 1813 the number had risen to two hundred and four, exclusive of honorary members. At this time the population of Boston was twelve thousand. Membership was not limited to Massachusetts physicians, but included men like Moses Appleton, of Waterville, Maine, Samuel Ayer, of Portland, Maine, William Buel, of Litchfield, Connecticut, Micah Eldridge, of Nashua, New Hampshire, George Hooker, of Syracuse, New York, Usher

Parsons, of Providence, Rhode Island, and Thomas Sewall, of Washington, District of Columbia.

The first volume of medical papers read at the meetings of the Society appeared in 1808. It included the following:

Edward Augustus Holyoke "An Account of the Weather and of the Epidemics at Salem."

Hon. William Baylies "An Account of the Ulcerated Sore Throat as it appeared in the Town of Dighton, 1785 and 1786."

Joseph Orne "Experiments with the Common Cow Parsnip."

Nathaniel W. Appleton "Successful Treatment of a Paralysis of the Lower Limbs, Occasioned by a Curvature of the Spine."

Isaac Rand "A Case of Empyema, Successfully Treated by Operation."

Isaac Rand, Jr. "Observations on Hydrocephalus Internus."

Hon. William Baylies "Calculus in the Ureter."

John Warren "Use and Effect of Mercury."

Josiah Bartlett "Case of Spotted Fever with Dissections."

Thomas Welsh "Dissertation on Heat and Cold."

In this same year appeared the *Pharmacopoeia*, prepared by James Jackson and John Collins Warren.

Thus the standard of medical education was raised and intercourse among the members of the profession improved. The fellows of the Society believed it incumbent upon those who cultivated medicine to keep pace with the general progress of human attainments. Later presidents who maintained the same high standard set by Edward Augustus Holyoke were William Kneeland, Cotton Tufts, Samuel Danforth, Isaac Rand and John Warren.

Ebenezer Alden, in his account of the origin and progress of the Massachusetts Medical Society read May 30, 1838, stated that it could boast of two schools of medicine and that graduates of the Berkshire Medical Institution were entitled to the same privileges as those of the Harvard Medical School. It had a weekly press devoted to medical discussion. Up to the founding of the Society there had been no attempt made publicly in New England to communicate medical instruction, if we except a course of lectures by William Hunter, an eminent physician and surgeon in Newport, Rhode Island, given in 1754-1756, and a short course on anatomical demonstrations in Boston by John Warren, given in the winter of 1780.

Standards of medical practice were raised by the Board of Censors, the members of which were under oath to the faithful performance of their duties, and were subject to a heavy fine for any neglect.

According to Alden, the medical department of

Harvard University was well organized by 1782. At one time, no little friction existed between the faculty of the College and the fellows of the Society on the subject of conferring medical degrees. Finally, by mutual conference the Society obtained assurance that the standard of medical education would not be lowered. Another great benefit to the public good was the legalizing of the study of anatomy. In February 1829 at a meeting of the councilors, a petition was prepared for the legislature asking for a modification of the laws then existing which prohibited the procuring of subjects for anatomical examination.

It was felt, however, that the subject was beset with difficulties, time and effort were needed to prepare the public mind for so great a change. Circulars were distributed to the fellows and to other intelligent and influential individuals. As a result, on February 28, 1831, an act was passed legalizing the study of anatomy, an act which has brought honor on our state as the first to set an example of such enlightened legislation.

An effort was made to suppress quackery, a very difficult task for the Society. All useful discoveries in medicine were made public, especially those relating to epidemics and unusual diseases. Irregular practitioners of every grade were excluded from fellowship in the Society. A system of correct professional conduct was maintained among the members.

I wish now to review briefly the lives of two of the outstanding figures in the founding of the parent society. Edward Augustus Holyoke, the first president of the Society, and William Baylies of Dighton.

Edward Augustus Holyoke was born in Marblehead on August 1, 1728. His father was Edward Holyoke, of Boston, who was educated at Harvard and later became pastor of the Congregational Church in Marblehead. In 1737 he was chosen president of Harvard College. President Holyoke married three times, and Edward Augustus was the offspring of the second marriage. In 1742 the boy entered Harvard College. His thesis subject was *Labor Improbis Omnia Vincit*, a motto which guided his future life. He was graduated in 1746, and began the study of medicine with Dr. Berry, of Ipswich, the most distinguished practitioner of the neighborhood. In 1749 he came to Salem to begin a long and useful practice. Six years later he married Judith Pickman, who died in childbirth. In 1759 he married Mary Viall, daughter of a Boston merchant, and by this second wife he had twelve children, ten of whom died of diseases then prevalent in early childhood.

During Holyoke's lifetime the medical pro-

fession abounded in discouragements which, to say the least, are greatly lessened in our day. The standard of medical education was totally unsettled.

Few physicians have done so much for the profession as did Holyoke. He made an average of over eleven visits a day for seventy-five years. On one occasion when measles was prevalent, in 1787, he made over one hundred professional visits in a day for several days. He was never averse to trying new remedies, but did it with great caution in order to ensure the safety of his patients.

Holyoke had great urbanity of manners, and was what Bacon has styled a full man. His ability and eminence in his profession, united with his great learning and his fine taste for those arts which embellish human life, made him an ornament, not only to his own profession but to the nation and age in which he lived.

In one paper he stated:

It is much to be wished that practitioners would more generally commit to paper their thoughts and remarks upon diseases as they arise, and communicate them to the Society, which though attended with some labor would be amply rewarded by the benefit which would accrue to themselves, their patients and the art they profess.

On August 1, 1828, his one hundredth birthday, Holyoke walked from Salem to Boston in order to attend a public dinner given by his friends. Also the district medical society requested him to sit for his portrait to be placed in its library. By this time he had completed his *Recollections*, a delightful account of his activities. He walked five or six miles daily, rode horseback occasionally, and had excellent health except for impaired hearing. On November 24, 1828, he received an injury to his right leg on stepping out of his carriage, and his health declined steadily thereafter. He died March 21, 1829. A postmortem examination was made and all the local physicians were present. What an example, even for the highly advanced culture of today!

William Baylies was born in Uxbridge on November 24, 1743. He was a man of fine mental endowments, and held many positions requiring high intelligence and sound judgment. He frequently held council with the leaders of the medical profession in New England, and by his associates he was considered a master mind. Graduated from Harvard College in 1760, he went to New Bedford to study medicine with Elisha Tobey. He began to practice medicine in Taunton where he married Bathsheba, the daughter of Samuel White, the first lawyer of Taunton. Their daughter Elizabeth married Samuel Crocker, one of the

first merchants of the town, and one son, Samuel White Baylies, studied law with Governor Sullivan. Another son, William Baylies, of West Bridgewater, was eminent as a lawyer, and still another, Francis Baylies, was one of the leading historians of the Old Colony.

William Baylies was a member of the Provincial Congress, which convened in 1775. During the Revolution, he was often in the councils of the State. In 1784 he was appointed registrar of probate for Bristol County, and was an elector for president and vice-president in 1800. He was an original member of the Medical, the Historical, the Agricultural and the Humane societies of Massachusetts and a fellow of the Academy of Arts and Sciences. A skillful physician and author of many significant medical treatises, he practiced medicine in Dighton for many years.

Altogether too seldom has his name been referred to in the historical references on the early history of the Massachusetts Medical Society, and in this locality there are no commemorative insignia to reveal his importance as one of the founders of the Society.

The two Bristol County medical societies trace their origin to a period when members of the Massachusetts Medical Society were widely scattered throughout the Commonwealth. Travel was slow and expensive. One meeting each year was considered all that the members could reasonably be expected to attend. Therefore, as the Society increased in numbers, district societies were formed, all under the control of the parent society but appointing their own officers, and receiving and disposing of property outside the authority of the Massachusetts Medical Society.

Approaching the time that the Bristol District was formed, it had been the custom of the secretary of the Society to refer to the subdivisions as departments, numbered from one to ten. In 1840, the departments were referred to as districts, designated by the points of the compass. The Southern District included Fall River, New Bedford and the Cape. Later on, the districts were referred to by the county name, and finally, the records show a combination of geographical and county names.

Of the original departments, Bristol was the ninth. The records are in no wise complete, but some facts are known regarding the genesis of the district societies. Because of the difficulties of attending the general meetings, petitions for district societies were presented in the early nineteenth century from members in Suffolk, Essex, Worcester, Berkshire and Hampshire counties, and were granted. These district societies went immediately into active operation, each holding two meetings a year. This arrangement has

proved highly useful, and has continued to the present time. The societies acquired libraries, collected medical periodicals and discussed current local problems. They invited lecturers and encouraged the members to take courses in medicine and anatomy. Physicians in Bristol, Plymouth, Dukes and Nantucket counties petitioned for the establishment of a district medical society at a meeting of the Council held October 3, 1838, and the charter which was subsequently granted resulted in the formation of the Southern Medical District Society. The petition read as follows:

The subscribers hereby make application for the establishment of a district medical society to be called the SOUTHERN MEDICAL DISTRICT SOCIETY, to include the following towns, viz New Bedford, Fall River, Taunton, Freetown, Fairhaven, Dartmouth, and Westport of Bristol County, Middleboro, Rochester and Wareham of Plymouth County, Chilmark, Tisbury & Edgartown of Dukes County and Nantucket, and the place of meeting to be at New Bedford.

ALEXANDER READ

PALL SPOONER

SAMUEL SAWYER

JULIUS S MAYHEW

ANDREW MACKIE

WILLIAM C. WHITRIDGE

New Bedford, September 12, 1838

This resolution was submitted by Enoch Hale, S. D. Townsend and John Homans. Soon afterward the name was changed to the Bristol South District Medical Society.

The first officers of the society, as recorded in May, 1840, were

| | |
|-----------------------------------|----------------|
| William C. Whitridge, New Bedford | President |
| Peter Mackie, Wareham | Vice-President |
| Amory Glazier, Fall River | Vice President |
| Samuel Sawyer, Fairhaven | Secretary |
| Paul Spooner, New Bedford | Treasurer |
| William R. Wells, New Bedford | Librarian |

Ten years later, June 20, 1849, the Bristol North District Medical Society was organized to include all fellows of the Massachusetts Medical Society residing in Taunton, Seekonk, Attleboro, Rehoboth, Norton, Mansfield, Easton, Raynham, Berkley, Freetown, Somerset, Dighton and Swansea.

When the state line was changed in 1862, nearly all of Pawtucket and a part of Seekonk were attached to Rhode Island, and members of those places afterward became known as non-resident fellows of the Massachusetts Medical Society.

A glance at the medical history of the State shows that many prominent physicians were practicing before the founding of the Massachusetts Medical Society and before that of the Bristol South District Medical Society.

Before 1800 the medical news and literature from New Bedford emanated mostly from Ebenezer Perry, the only physician of the town. About

the year 1795 his charge for a visit was sixpence and thus he kept all other physicians at a distance. An English lady who was under treatment at this time was so much surprised at the meagerness of his charges that she asked to be furnished with the particulars of the bill, so that she might take it to England. After this, the doctor raised his price to one shilling per visit. It is said that Dr. Perry was a good, plain practical physician and an honest man, but poor. Another prominent physician was Elisha Tobey with whom William Bayles studied before he began his own practice in Taunton. Samuel Perry and his son, Samuel, were early practitioners.

The early members of the Bristol South District Medical Society who practiced in New Bedford were Samuel Perry, 1803, Alexander Read 1816, Paul Spooner, 1821, William C. Whitridge 1822, Andrew Mackie, 1824, Julius S. Mayhew 1830, Lyman Bartlett, 1833, William A. Gordon 1835, Edward W. Greene, 1839, and Elijah Colby 1847.

Alexander Read, a graduate of Dartmouth in 1808, located in New Bedford in 1811.

Paul Spooner opened an office in New Bedford in 1807 and practiced as a successful obstetrician for half a century. He died in 1862 at the age of seventy-six.

William Cushing Whitridge came to New Bedford in 1822 where he practiced until his death in 1857, aged seventy-four years. He served as the first president of the Bristol South District Medical Society.

Julius Stewart Mayhew came to New Bedford as a young school-teacher and gave singing lessons, then entered Harvard Medical School. He came from a long line of physicians, there having been a doctor in each generation of the Mayhew family for hundreds of years. He joined the Massachusetts Medical Society in 1830 and took an active part in organizing the Bristol South District Medical Society. He was a foe to all types of oppression and among the first to cast an Abolitionist vote in New Bedford. In truth, he was a man of the old school.

William Alexander Gordon became a fellow of the Massachusetts Medical Society in 1835. He was born in Newburyport and was graduated from Harvard Medical School. He came to New Bedford in 1839, and took an active part in founding the Bristol South District Medical Society.

Elijah Colby came to New Bedford in 1830 and practiced until his death in 1856. He was treating a patient an hour before his own death. It is said that he was never known to speak a cross word in his life.

The medical history of Fall River began some what later than that of New Bedford. The inhabitants of the town were forced to rely on physicians in surrounding towns for medical aid. The first doctor of the period was Amory Glazier, who began to practice in 1811.

The early members of the Bristol South District Medical Society who practiced in Fall River were Henry Willard 1832, Amory Glazier, 1839, Jason H. Archer 1839, Foster Hooper 1839, Ebenezer T. Learned 1839, William H. A. Crary 1840, Thomas Wilbur, 1841, Phineas W. Leland, 1851 and Jerome Dwelly, 1851.

Henry Willard belonged to the doctor-preacher type.

About 1811 when the population of Fall River was about 1100, Amory Glazier began to practice. He was for some years the only physician in the place. In 1811 he married Ann Chaloner Durfee and lived a long useful life.

Jason Hives Archer began to practice about 1820. Born in Wrentham in 1795, he entered Brown University in 1812 and was graduated in 1816. He then studied medicine with William Ingalls, of Boston. In his home was stored the so-called skeleton in armor which was destroyed in the fire of 1943.

In 1826, when Fall River's population numbered 2000 souls, Foster Hooper began practicing after graduating from the Burlington Medical School. He was in the front rank of his profession and also took an active part in public affairs.

Ebenezer Turell Learned was born in Gardner. He was graduated from Harvard Medical School in 1836, and studied with Perry Bowditch Gould and Wymann, of Boston. He practiced for ten years in Weymouth and then attended Jefferson Medical School. He came to Fall River in 1846. Quiet and reserved, he had a vein of humor and a kindly sympathy which made him the ideal family doctor. He retired from practice in 1883 and died two years later at the age of seventy-two. His son and grandson followed his profession and were blessed with many of his virtues.

By 1840, the population of Fall River was 6735. During this year William Henry Allen Crary began practice there. Born in Assonet in 1817, he attended schools in Fall River and academies in Plainfield and Colchester, Connecticut, going on later to the Berkshire Medical School and then to London, Paris and Dublin. At the time of the first trial of ether in Fall River this anesthetic had been in use for about a year, but physicians were rather slow in adopting it. Hooper and Crary decided to make a personal trial. They went to the office of Ledoyt, a dentist, and

Crary allowed himself to be etherized. Hooper did the administering, but the quantity was not sufficient to produce insensibility to pain, and it had the effect of making Crary decidedly and aggressively nervous. He used his fists, much to the discomfort of Hooper and Ledoyt. Crary married Amy H. White in 1840, and that same year joined the Bristol South District Medical Society. He died at the age of thirty-seven, after a practice of fourteen years.

Thomas Wilbur was born in Hopkinton, Rhode Island. He was graduated from the Yale Medical School in 1824, and studied for a number of years in Philadelphia. He first practiced in Swansea and then came to Fall River. He had seven children. A granddaughter, Dr. Mary W. Marvell, a graduate of Johns Hopkins, is now a physician in Fall River. Wilbur was admitted to the Bristol South District Medical Society in 1841. He died in Missouri, while on a business trip, at the age of sixty-two years.

Phineas Washington Leland was one of the most resourceful and public-spirited physicians of his time. He was born in Grafton in 1798, and studied medicine with George Cheever Shattuck, of Boston, receiving his degree from Bowdoin in 1826. He was collector of customs in Fall River for twenty years. In 1842 he was elected to the State Senate, as president of the Fall River Athenaeum, editor of the Fall River *Patriot* and one of the founders of the Fall River Public Library; he was greatly interested in educational matters. He was admitted to the Bristol South District Medical Society in 1851. He died in 1870, aged seventy-two, after a practice of thirty-six years.

Jerome Dwelly, although born in 1823, was in active practice in the early years of the present century in Tiverton, Rhode Island. He attended Pierce Academy in Middleboro. He studied medicine with Thomas Wilbur and later with William E. Townsend, of Boston. In 1847 he was graduated from the Harvard Medical School and began to practice immediately. With Crary he gave ether successfully, producing complete anesthesia, operating on the son of Thomas Smith, who had been injured by the handle of a paint brush penetrating the muscles of the back. This was the first successful use of ether in this part of the State. Dwelly was city physician in Fall River from 1855 to 1868 and was medical examiner in this district for more than a generation. He died in 1913 at the age of ninety, after a long, active, faithful practice of sixty-four years.

Bearing in mind our heritage from these great physicians of the past, and the final act of its first

president in leaving instructions for his own post-mortem examination, may we not do something constructive in commemorating this anniversary in the nature of an act to improve our standards of practice?

Morbid anatomy may be regarded as one of the essential supports of the medical edifice, the chief cornerstone upon which it may repose in security. All its teachings are facts. We must not withdraw from the age-old recognition of the value of truth in daily practice.

To face the truth at the autopsy table is sometimes humiliating, but far greater progress is made in such self-abnegation than by a wealth of conjecture. Let us launch a movement to encourage physicians of this district and others in the Commonwealth to devise ways and means to educate the public as to the value of the postmortem examination.

Therefore, in closing, I venture to offer this resolution.

WHEREAS, Morbid anatomy is the foundation of medical knowledge, and

WHEREAS, The lessons derived therefrom constitute a most powerful postgraduate study, and

WHEREAS, The number of postmortem examinations now obtained both in hospitals and outside is deplorably small, therefore be it

RESOLVED, That the Massachusetts Medical Society appoint a committee to study the subject with a view of petitioning the General Court of the Commonwealth to increase the facilities for postmortem examination by making available the services of one well-trained pathologist in each district of the Massachusetts Medical Society.*

The preparation of this material in the form of annals or chronicles, including biographical references of the early participants in the affairs of the Bristol South District Medical Society, has been time-consuming but not a chore. It so happens that since 1916 I have been in possession of a complete set of the *Transactions* of the Massachusetts Medical Society from 1781 to 1900. A more interesting, informative and stimulating collection of records would be difficult to find.

I found many personal and interesting references from the pamphlet *Early Physicians of Fall River*, by the late Dr. A. C. Peckham, who was recognized as the historian of the medical profession in this district, where he practiced for more than sixty-five years.

The reader who is interested may find further il-

*The above resolution was unanimously adopted.

luminating material in Dr. Henry R. Viets's book, *A Brief History of Medicine in Massachusetts*.

I regret that time does not permit a report on the contemporary history of the Bristol South District Medical Society. No doubt it is familiar to many of our members, and may be presented on some future occasion. Looking back over the period which I have covered in a somewhat cursory manner, it is apparent that this society has continued to flourish with and in the path of the

parent society. The medical profession of the State of Massachusetts has maintained its prominent position in the advance of medical knowledge. In no other period in the history of medicine have the prevention and cure of disease made such progress as in the past few decades. In this advancement of medical knowledge the fellows of this society as a whole have contributed in full measure.

151 Rock Street.

REPORT ON MEDICAL PROGRESS

BACTERIAL INFECTIONS OF THE GASTROINTESTINAL TRACT*

CHESTER S. KEEFER, MD†

BOSTON

ONE of the major problems in preventive medicine and public health is the control of bacterial diseases of the gastrointestinal tract. It is no exaggeration to say that greater strides have been made in the prevention of these diseases than in any other group of epidemic diseases, with the possible exception of diphtheria. In the Western Hemisphere, at least, the decrease in the number of cases of typhoid fever, infantile diarrhea and dysentery has been brought about through the co-operative activity of physicians, sanitary engineers and public health officials who have devised methods for protecting the food and water supply of the public and for preventing the spread of infection. In spite of all these advances, we must not allow such victories to give us a sense of false security, since the infections mentioned are still far too common in many communities. It is well then, to review some of the features of the various infections which aid in their recognition and prevention.

TYPHOID FEVER

The decline in the number of cases of typhoid fever in the last forty years is one of the remarkable achievements in medicine. In most large hospitals, the disease is indeed rare. The survey of the situation by Dublin and Lotka¹ in their recent book *Twenty-Five Years of Health Progress* serves to stress certain points. First, it is now clear that typhoid fever is more prevalent in small towns or villages than it is in either strictly

rural or urban populations. The explanation for this state of affairs would appear to be the inadequate control of water supply and sewage disposal, as well as a lack of adequate control of carriers and infrequent vaccination.

The recognition of typhoid fever usually causes no difficulties, since the isolation of the typhoid bacillus from the blood, urine or stools or the detection of specific agglutinins in the blood serum of the patient serves to establish the diagnosis. Certain difficulties may arise if typhoid fever develops in a previously inoculated individual or if the disease is very mild. The difficulties in diagnosis in those previously inoculated are most evident in patients who may fail to show bacteremia but who show a positive agglutination test. The question then arises whether the agglutination reaction is evidence in favor of an active infection or only a reaction to the previous inoculation in a patient with another entirely different infection.

When one is confronted with the problem of fever in an individual who has been previously inoculated against typhoid fever and who shows a positive agglutination test but no organisms in the blood, urine or stools, the following procedures should be carried out in order to establish whether or not one is dealing with a case of typhoid fever.

Agglutination tests should be carried out with H and O antigens, possibly with Vi antigen, and they should be done serially, that is, once every five to seven days. Since the interpretation of the results of these tests is of considerable importance in diagnosis, it is necessary to be familiar with their significance.

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Agglutinins against the H antigen (flagellar antigen) appear in the blood of vaccinated individuals, and may persist for a number of months following inoculation. Their presence, therefore, in the blood of a patient with suspected typhoid fever who has been inoculated may be of little diagnostic significance unless the titer should increase to 1 500 or 1 000 as the fever progresses. In some non-inoculated individuals who develop typhoid fever, H antibodies may be absent. For this reason it is always well to use O antigen in the tests as well.

Agglutinins against O antigen (somatic antigen) appear in the circulating blood during active typhoid fever even when H agglutinins are not present. They are present in the blood of previously inoculated individuals much less often than are H agglutinins. Their presence in the circulating blood, then, in a titer of 1 200 or 1 500 is highly suggestive of an active infection.

Agglutinins against Vi antigen (Felix and Pitts' antigen) appear in the blood during an active infection with typhoid bacilli but not in inoculated individuals. It is usually unnecessary to include this antigen in the test, since no case of typhoid fever develops Vi agglutinins without developing H or O agglutinins or both. Its principal use is in testing the blood of vaccinated subjects who are suspected of having typhoid fever and who may show H and O agglutinins owing to previous inoculations.

From this brief discussion, it is obvious that the use of both H and O antigens is helpful in the diagnosis of active typhoid fever in both inoculated and non-inoculated patients. Moreover, a single agglutination test may not be sufficient to establish the diagnosis unless the titer of agglutinins is high (1 500) and the patient has not been inoculated.

One is occasionally confronted with the problem of the patient who has fever without localizing signs of infection and in whom the course of the disease is that of typhoid fever. The blood cultures and agglutination tests are negative. The failure to demonstrate agglutinins in the circulating blood may be due to the failure to use both H and O antigens, or the failure to use enough antigens in the typhoid-salmonella group. It is now established that at least twelve distinct serological types of typhoid-salmonella organisms are capable of producing the clinical picture of enteric fever. Therefore, the failure to detect agglutinins to antigens of the typhoid and paratyphoid A or B bacilli in a patient who shows the clinical picture of enteric fever may be due to the fact that the proper antigen has not been used in the test.

There is now convincing evidence that the incidence of typhoid fever can be reduced by means of prophylactic inoculation. That inoculated subjects may develop typhoid fever there is no doubt. This is especially likely to occur if the infecting dose has been large, the exposure frequent and the time between exposure and inoculation has been over three years. There is also suggestive evidence that inoculation of patients with vaccine which is made from strains which fail to contain an adequate amount of O antigen may afford very little protection. When vaccinating, it is well, then, to be sure that the vaccine is prepared from a smooth, virulent strain. At present, the United States Army is using the "Panama 58" strain for the preparation of vaccine rather than the old "Rawling's" strain, since it has been found that the latter has become degraded and often fails to stimulate adequate antibodies as determined by mouse-protection and other tests.

In short, all persons who are living in or plan to visit areas where typhoid fever is prevalent should be vaccinated against it. The vaccination should be repeated every three years, and the vaccine should be prepared from a smooth, virulent strain of organism.

ACUTE FOOD POISONING DUE TO BACTERIAL INVASION OR BACTERIAL PRODUCTS

Every year, especially in the summer months, physicians encounter cases of acute food poisoning resulting from bacterial infection or its products. Experience has shown that these cases are due either to the toxic products of the killed bacteria or to the combined activity of the living bacteria and their toxic products. Poisonous substances which develop as a result of the growth of bacteria in meat or other food may also play a part.

From numerous studies,³ it has been shown that food poisoning is usually caused by the salmonella group of organisms, and in the majority of cases *Salmonella aertrycke* and *S. enteritidis* are the most important. Rarely *S. supestifer* and *Shigella dysenteriae* cause symptoms of acute food poisoning. The foods which are most likely to become infected are meats and fish,—especially when canned,—milk products and, less often, sea food and fruits.

The clinical features of food poisoning are relatively uniform, although they vary greatly in severity and duration. The three cardinal symptoms are abdominal pain, diarrhea and vomiting. The variation in the clinical picture depends on the amount of toxic material ingested and whether or not living bacteria are present as well. In oc-

casual cases, vomiting may be infrequent or absent. In many cases, however, vomiting is very severe and persistent and is the outstanding feature. Indeed, in some epidemics abdominal pain and diarrhea may be entirely absent. In these nausea and vomiting associated with high fever are the conspicuous features.

For purposes of description cases of acute food poisoning may be divided into three groups: cases in which the symptoms are purely those of irritation of the gastrointestinal tract without absorption of any toxic substances; cases in which the symptoms are those of a severe gastroenteritis with constitutional symptoms (fever, prostration, cramps and so forth); and cases in which the constitutional symptoms and signs are more protracted and conspicuous than those of the gastroenteritis.

In the first group the incubation period is short, recovery is rapid and there are no after effects. Fever and prostration are absent.

In the second group the incubation period is about two to four hours after the ingestion of food; the onset is acute and severe, with symptoms of gastroenteritis, and constitutional symptoms such as fever, prostration and muscle cramps, occur. Very often the acute symptoms disappear within twenty-four to thirty-six hours and recovery is rapid. There is evidence supported by animal experimentation that the acute gastroenteritis is due to the local action of the undestroyed toxins, whereas the constitutional symptoms result from their absorption. There is very little to indicate that the symptoms in these cases are due to the ingestion of living bacteria.

In the third group the symptoms are due to infection with living bacteria as well as to toxins. As a rule, the incubation period is not less than twelve to eighteen hours, the initial symptoms are less acute and abrupt, and the constitutional symptoms are much more striking and protracted.

The precise etiologic diagnosis of bacterial food poisoning may be exceedingly difficult in the cases in which the symptoms are due to the effects of the toxin alone. The examination of excreta for living organisms should be carried out in all cases of suspected food poisoning and after a week or more, the examination of the blood for specific agglutinins (*S. aertrycke*, *S. enteritidis*, *S. typhimurium*) may aid in the etiologic diagnosis. Samples of the suspected food should be obtained and sent to laboratories which are equipped to study these infections by means of both culture and animal experimentation.

The prevention of food poisoning may be difficult, but it is perhaps well to recall that in hot

weather all food should be cooked thoroughly, if it is eaten in the cold state, it should be protected from contamination and adequately refrigerated.

Serious infections of the gastrointestinal tract in infants have been described by Schiff¹⁰ as being due to other strains of *Salmonella* such as the "Panama strain." It is important, then, in any case of acute infection of the gastrointestinal tract to study the case from the point of view of *Salmonella* infection.

DYSENTERY

Bacillary dysentery is still a common disease in the summer months of the year in various parts of the United States. The symptoms and signs vary widely so that the recognition of mild cases may be exceedingly difficult, unless the possibility is entertained in all cases of diarrhea and appropriate methods are used for detecting the organism in the stools or for studying the blood for specific agglutinins. In a few cases the symptoms and signs of dysentery are not unlike those of acute food poisoning and blood and mucus fail to appear in the stools in others. The diagnosis is suggested immediately by the presence of mucinousanguineous stools, diarrhea and tenesmus.

The diagnosis of dysentery can be made by isolating the organism from the stools. These should be obtained in their fresh state and cultured as quickly as possible. If there is a delay between the time that the stool is passed and the time it arrives in the laboratory, it is well to preserve it in glycerin, as recommended by Wu and Sia.⁴ Their procedure was to use two parts of 50 per cent glycerin and one part of stool. In this way the stools were preserved so that dysentery bacilli could be isolated from them much more readily than when glycerin was not used.

Within recent years, a great many mild cases of dysentery due to the Sonne strain have been recognized especially in New England. Since the infections due to this organism may be mild, they are frequently overlooked and serve as a source for the spread of the infection. Indeed one of the problems in the control of dysentery is the difficulty in recognizing carriers and mild cases. These sources of infection are frequent and not readily recognized.

Aside from the lesions in the colon, there are other clinical features of bacillary dysentery requiring comment. These are the nonsuppurative complications occurring within fourteen to twenty-one days or longer after the onset of dysentery: arthritis, conjunctivitis and urethritis.

During and following an acute bacillary dysentery, an acute arthritis may be a feature of the illness. Usually it develops during convalescence from the symptoms referable to the intestines, commonly appearing between the tenth and the thirtieth day after the onset of illness. The joints most frequently affected are the knees, hips and those of the hands. With the onset of the arthritis there is fever of indeterminate duration varying from 100 to 102°F, which may continue for three weeks. The local condition of the joints is characterized by pain, tenderness and swelling, limitation of motion and occasional periarticular swelling with involvement of the tendon sheaths. There is normally no redness of the skin, although the surface temperature may be elevated. The fluid is light yellow and slightly turbid, and contains moderate amounts of mucin and between 1000 and 10,000 white blood cells per cubic millimeter, with polymorphonuclear leukocytes predominating. The fluid is invariably sterile, but it may contain agglutinins against the infecting strain of dysentery bacilli. The outlook for complete recovery and normal joint function is excellent, in spite of the fact that symptoms may be severe and continue for as long as two or three months.

Conjunctivitis following dysentery is usually a simple catarrhal inflammation of the conjunctiva, and the exudate never contains dysentery bacilli. The objective signs are conspicuous, and the subjective symptoms may be minimal. In most cases the inflammation subsides after a few days and causes no permanent damage.

The urethritis which has been described by various investigators, especially Schittenhelm and Schlecht,⁹ may occur with the arthritis or with conjunctivitis. It may be difficult to distinguish from the urethritis due to gonococcal infection, which is not infrequently accompanied by conjunctivitis. The diagnosis is based on a history of an acute bacillary dysentery followed by an arthritis of the larger joints, with sterile synovial effusion, from which complete recovery occurs. When the arthritis is accompanied by a conjunctivitis, iritis or urethritis, such as was observed in numerous cases by Schittenhelm and Schlecht during the World War, the discrimination between dysenteric and gonorrheal arthritis may be difficult. The bacteriological examination of the stools and of the urethral secretion, together with the history, should make such a differentiation more certain.

SUIPESTIFER INFECTIONS

Within the last few years there have been an increasing number of reports of infections due to *S. supestifer*, and excellent reviews of the subject

have been made by Harvey,⁶ Kuttner and Zepp⁷ and Cohen, Fink and Gray.⁸ This organism is also known as the bacillus of hog cholera, and for a time, before the true nature of hog cholera was known, it was considered to be the etiologic agent of the disease. The normal habitat of the organism is in swine, but it may produce infection in man by infecting food such as pork, ham, sausage, milk, tapioca pudding, ice cream, crab meat or veal. So far as is known, the organism enters the body via the gastrointestinal tract and produces symptoms of fever without localizing signs of infection, of fever with foci of infection in various organs or of acute food poisoning.

Infections with this organism occur sporadically and not in epidemic form. For this reason, it is frequently impossible to trace the source of infection or to prove that the infection was caused by eating infected food. One is especially likely to observe such cases following surgical operations or during the course of debilitating diseases. Many of the cases described have occurred in children. The mortality increases with age, so that under twenty-five years of age it is about 20 per cent, whereas over twenty-five it is in the neighborhood of 60 per cent.

In from 50 to 60 per cent of cases of infection by *S. supestifer* the outstanding feature of the illness is fever without localizing signs of infection. The diagnosis in such cases is made by isolating the organism from the circulating blood, stools or urine or by detecting specific agglutinins in the circulating blood. In some cases, positive agglutination reactions in the blood do not appear for three to five weeks following the onset of the infection, so that the diagnosis may be missed if repeated tests are not done.

Metastatic foci of infection due to *S. supestifer* organisms are not infrequent following bacteremia.⁶⁻⁹ The common areas involved are the lungs (33 per cent), the joints (15 per cent) and the bones (5 per cent), the respective lesions being pneumonia, arthritis and osteomyelitis. Other less common lesions are pyelonephritis, abscess of the spleen, cholecystitis, meningitis, pericarditis and pleural effusion.

STAPHYLOCOCCAL INFECTIONS

Following the ingestion of food which has become contaminated with *Staphylococcus aureus*, the symptoms of acute food poisoning, namely nausea, vomiting and diarrhea, may occur. These organisms have been isolated from cakes and pastries (filling in chocolate éclairs, cream puffs and so forth), and it has been demonstrated conclusively¹¹ that the acute symptoms are due to the

action of toxins which are produced by the growth of organisms. The infections usually occur in localized outbreaks, and the symptoms begin within a few hours, usually two to three, after the ingestion of the infected food. The diagnosis can be made by isolating staphylococci from the suspected food. Recovery is usually complete, except for rare fatal cases in which abscesses of the intestinal wall occur.¹² It is perhaps well worth remembering that not all strains of *Staph aureus* produce toxin which is capable of causing acute gastroenteritis, so that the mere finding of these organisms in food does not necessarily mean that they are the cause of the infection. A careful search for other organisms should also be made. 818 Harrison Avenue.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26031

PRESENTATION OF CASE

First Admission A forty-one-year-old woman was admitted to the hospital complaining of headaches of three months' duration.

Seven years before admission the patient apparently suffered from some form of "shock," which left her with a "paralyzed" left leg and arm for about three months. The left eye was similarly involved in this paralysis, although the exact nature of the involvement could not be determined. There were associated headaches which were made worse by emotional stress and excitement. She recovered from these complaints in three months and was well for over six years until three months before admission when she again experienced generalized headaches and pain behind both eyes, with associated vertigo. These symptoms became worse during times of stress and excitement and were occasionally associated with vomiting.

Physical examination revealed an obese woman in no apparent discomfort who however, complained of intermittent headaches. Examination of the heart, lungs and abdomen was negative. The blood pressure was 100 systolic, 65 diastolic. The pupils were round and regular, but the right was larger than the left, both reacted slightly and sluggishly to light, but equally and actively to accommodation. There was slight choking of both optic disks. The whole left side, that is, the shoulder, elbow, knee and ankle muscle groups, seemed slightly weaker than the right. Orientation, cooperation and memory were apparently normal. Attention was poor. The remainder of the neurological examination was negative.

The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 5,500,000 with a hemoglobin of 80 per cent, and a white-cell count of 5500 with 58 per cent polymorphonuclears, the stained smear was normal. The urine was negative. The blood Hinton and Wassermann tests were negative. A lumbar puncture showed an initial pressure of 230 mm of water, which responded well to jugular compression, the total protein was 36 mg per

100 cc, and the sugar 65.3 mg, the fluid contained 3 lymphocytes per cubic millimeter, and the Wassermann and gold-sol tests were negative. Roentgenograms of the skull were negative. An encephalogram was unsatisfactory.

The patient remained in the hospital for about three weeks for observation. Her headaches persisted. She was discharged unimproved.

Second Admission (two months later) It was stated that the history was almost of negligible value because of language and "mental" difficulties. It was thought that she probably had had constant headaches since her discharge. She had non-projectile vomiting a few times, and was admitted because of a continuation of the symptoms noted on her first admission. Her physical and neurological examinations were unchanged except that there was a bilateral papilledema of 3 diopters, with engorged retinal arteries and veins but no hemorrhages. Her temperature, pulse and respirations were normal, and the blood pressure was 146 systolic, 90 diastolic. Roentgenograms of the nasal sinuses and skull were essentially negative.

On the fourth hospital day a right subtemporal decompression was performed under Avertin-ether anesthesia. The dura was tense, and when it was incised crucially, the brain herniated considerably. There was no local evidence of tumor, but the cortical vessels were unusually large and tortuous and seemed more numerous than under normal conditions. No exploration below the surface was made. The dura was not closed; no bone was replaced, the wound was closed in layers, with the decompression area well filled. She had an uneventful convalescence, seemed somewhat improved and was discharged on the twenty-first postoperative day to be followed in the Out Patient Department.

Six months later she complained of pain in the top and back of the head. The decompression area bulged moderately but was not tense. There was a slight left central facial weakness, and the knee jerks were active, the left greater than the right. There were no other positive findings. She failed to report to the clinic thereafter until she was readmitted to the hospital.

Third Admission (four years later) She complained of periodic exacerbations of headaches in the region of the operative defect, associated with dizziness, vomiting and dimness of vision. These episodes occurred every four to fifteen days and lasted a few days. The physical, laboratory and neurological examinations were negative. The optic disks showed no atrophy or papilledema. The decompression wound was tense but did not

pulsate or bulge. A lumbar puncture showed an initial pressure of 220 mm of water, which rose to 400 mm with jugular compression. On removing 2 cc. of spinal fluid the pressure fell to 190 mm., and after 12 cc had been removed it was 90 mm. The fluid was clear and colorless and was negative to routine tests. The decompression wound was softer after the lumbar puncture. She was discharged on the seventh hospital day.

Fourth Admission (two years later). She came into the hospital because of vague generalized back and abdominal pains. The physical and neurological examinations were negative, except that her heart was slightly enlarged by x-ray and her blood pressure was 162 systolic, 100 diastolic. Roentgenograms of the dorsal spine showed changes consistent with those of a hypertrophic arthritis, skull plates were negative. She was discharged on the sixteenth hospital day with her condition unchanged.

Final Admission (two years later, fifteen years after her first shock). Two hours before her admission the patient was found unconscious on the floor. She had complained of numbness in the fingers the morning before entry. She was busy in the kitchen when, unobserved, she collapsed. Physical examination showed an obese, cyanotic and comatose woman breathing stertorously. The pupils were small but reacted to light. The fundi showed slight papilledema, with hemorrhages and pigmentation. The soft tissues below the old decompression wound were bulging and seemed under considerable tension. No movement of any extremity was noted but the reflexes were depressed. There was no Babinski sign, nor stiff neck. There were numerous coarse rales in the chest, and peripheral edema. Because of the stertorous breathing the heart sounds could not be heard. The blood pressure was 100 systolic, 60 diastolic. The patient failed rapidly and tracheal rhonchi appeared. The coma persisted and the temperature rose to 104°F., with increasing pulse and respirations. The systolic blood pressure dropped to 50, and she died about twenty hours after entry. No lumbar puncture was done but a needle was inserted into the bulging old craniotomy wound without result.

DIFFERENTIAL DIAGNOSIS

DR HENRY R. VIETS. This complicated case—and I think it must be complicated and undiagnosable because I have even been given the complete hospital record to read—began when the patient was thirty-four with paralysis lasting three months on the left side, presumably due to a right-sided brain lesion, which was probably on a vas-

cular basis. Seven years later she came in and there was still evidence of weakness on the left side, but no true hemiparesis or hemiplegia. She had begun to show signs of increased intracranial pressure and we find that there was some confirmatory evidence on lumbar puncture. The initial pressure was 230 mm of water otherwise the cerebrospinal fluid was negative. X-ray study did not help in the diagnosis; the encephalograms, unfortunately, were unsatisfactory. The latter might have been of help in throwing some light on the nature of the lesion. One presumes that the diagnosis of a brain tumor, a right-sided lesion in the parietal region, was suspected, but there was not enough evidence to justify operation.

She came in again within two months with more symptoms: constant headache and bilateral papilledema of 3 diopters, with engorgement of the retinal arteries. The diagnosis seems clearer than ever of increased intracranial pressure on a neoplastic basis but again the lesion did not appear to the physicians in the hospital to be local. They did subtemporal decompression. The vessels were unusually large and tortuous and seemed more numerous than normal. In spite of the fact that the surgeons were looking through an opening not much larger than a silver dollar, an abnormality of the blood vessels on that side was observed. That is the side on which one would suspect the lesion to be.

She improved but six months later was seen in the Out Patient Department with a bulging of the decompression and a little evidence of left facial paralysis; the reflexes were somewhat greater on the left side. In other words, the lesion was presumably increasing in size, or the findings were the result of operative interference.

Four years later she came back with more headaches, but this time she also had dizziness, vomiting and dimness of vision. They found no increased pressure by ophthalmoscopic examination and no atrophy of the disks. The decompression was tense, and the lumbar puncture still showed increased pressure (220 mm.) the decompression wound was softened as a result of the lumbar puncture. All we can say is that we continue to think that she had an intracranial lesion which resulted in increased intracranial pressure. We do not know anything more about its character or exact localization. At this period of observation there was presumably a decrease in the intracranial pressure, and one is inclined to state that the lesion was probably not a growing neoplasm. A new growth would have continued to increase the pressure but something had happened and the symptoms had definitely decreased.

in intensity. Then we turn back to the operation and recall the changes in the blood vessels. We begin to consider the possibility of a blood-vessel tumor rather than a solid neoplasm, such as meningioma or glioma.

On the fourth admission we have a little additional evidence that helps—provided the diagnosis of a blood-vessel tumor is ultimately going to prove to be correct—in that the heart had become enlarged. It is known that certain types of angiomas increase blood flow and may lead to secondary enlargement of the heart.

By the time of the final admission she had become extremely ill and died shortly after entry. Nothing from the record helps much except that she had had some sort of unconscious attack, had fallen on the floor, had gone into coma and died. The neurological examination did not throw any additional light on the diagnosis.

We have then, in summary, a patient whose symptoms began at thirty-four and who died at forty-nine. There is evidence that she had intracranial disease, and there is some evidence that the intracranial disease was on the right side of the brain in the parietal region. Evidence of increased intracranial pressure was present at times, and this pressure was only slightly, if at all, increased at other times. The course varied and was not definitely progressive; it was certainly not one that is usually associated with an ordinary type of brain tumor.

It seems likely that in spite of the five admissions to the hospital a definite clinical diagnosis was not made. Even from going over the record here, one gets the impression that no diagnosis can be made. It is presumptive of me to suggest a diagnosis, but I think I shall, in view of the fact that we ought to reach some conclusion even if we are wrong. I think that the patient had an angioma of some type.

There are a number of kinds of angioma. The commonest type perhaps is a hemangioma or an angioblastoma, which is usually in the cerebellum and not in the cerebrum. This is a true tumor, presumably the type described by Lindau,¹ associated with cysts in the cerebellum and occasionally in the cerebrum and with von Hippel's disease of the eye, cysts in the pancreas and so forth. That type of blood-vessel tumor is fairly well known, and we have had a number of examples here in the hospital. It is my belief that this patient did not have a true hemangioma, largely because of the facts that this type of tumor is familial and hereditary, that it practically always begins in the cerebellum and that it is associated with cysts and hemangiomas of the eye and elsewhere.

There are two other possibilities of angiomatous tumors. One is the cavernous hemangioma. This is quite possible here. I am not sure that it is the best choice. It usually does not have any definite connection with the meninges, being situated in the white matter, and consists of tumors of the blood vessels themselves, which tend to form cysts. I should rather favor a third type of tumor—an angiomatous malformation or congenital angioma.

If this diagnosis proves correct, is the lesion primarily venous or arterial or both? If it were venous one would not expect choked disks. Furthermore, ordinary venous angiomas of the brain are commonly associated with facial nevi and other venous changes in the skin which this patient did not have, so far as the record goes. In addition, they are often associated with epilepsy, which this patient did not have, unless the first "shock" was an epileptic attack, and are not often complicated by cardiac hypertrophy. A better diagnosis would perhaps be an unusual type of congenital malformation of the arteries of the brain which is ordinarily associated with choked disks. This type of tumor causes secondary cardiac hypertrophy, there may even be enlargement of the aorta. But we miss one very important point here, if the diagnosis is correct—there is no description of a bruit. A bruit should be heard in most cases of this rare type of angiomatous tumor, but it may not even have been listened for. If one had been noted it would have helped enormously in diagnosis. Also, increased vascularity of the skull was not mentioned—that too would have helped.

I am very doubtful about the diagnosis, but I should think that my best guess would be that, because of the duration of the symptoms, the remissions and the observations at the time of the decompression, this is an angiomatous tumor. This congenital type of angioma is confined, at least in part, to the right side of the brain and is more likely to be arterial than venous.

I should not be a bit surprised if some other diagnosis were made by the pathologist. What could it be? A slowly growing meningioma seems unlikely on account of the course. I think it might be a rare type, possibly a slowly growing glioma, with hemorrhage into it to begin the long train of symptoms. This seems less likely to me than a vascular tumor, therefore I shall stick to congenital hemangioma.

DR TRACY B MALLORY. Dr Ayer, would you like to comment?

DR JAMES B AYER. I hoped you would not call on me in this difficult case. I did not know the patient, and I do not know the diagnosis. Obviously we must be dealing with an intracranial

lesion producing an intermittent course over a period of fifteen years. There are very few tumors that can do this, although slowly growing ones have been shown to run a period even longer. Dr. Viets has elected one that may so act. I also suggest the possibility of a cholesteatoma, which may run a long course with intermittently progressive symptoms. Aside from tumors, we should not forget collections of cerebrospinal fluid which go under various names—serous meningitis, edema and so forth—and which not infrequently give a high degree of choked disks and symptoms of brain tumor, frequently without localizing signs. A group of these cases has been described by Dandy, some improved with decompression, others without. Putting the whole case together, I should agree that Dr. Viets has picked the most plausible diagnosis.

DR. WYMAN RICHARDSON: Would one not have to consider simple aneurysm at the base of the brain?

DR. MALLORY: Do you care to answer that, Dr. Viets?

DR. VIETS: There is no evidence that she had bleeding into the cerebrospinal fluid or any involvement of the extraocular muscles or nerves which are common in aneurysm. An aneurysm is, of course, a possibility, but the choking of the disks and the receding of the choking are against the diagnosis. She did not have any sudden episode except the final one.

DR. RICHARDSON: The first episode was sudden.

DR. VIETS: Possibly provided the history is accurate. After all these blood vessel tumors and aneurysms are difficult to differentiate, not only clinically but even pathologically.

CLINICAL DIAGNOSES

Cerebral hemorrhage.
Bronchopneumonia
Pulmonary edema

DR. VIETS'S DIAGNOSES

Brain tumor: angiomatous malformation
Cardiac hypertrophy: secondary

ANATOMICAL DIAGNOSIS

Cavernous hemangioma, probably congenital

PATHOLOGICAL DISCUSSION

DR. CHARLES S. KUBIK: I congratulate Dr. Viets. We did not suppose when this case was selected for discussion that anybody would be likely to make a correct diagnosis, but thought it ought to be taken up because the patient had been observed for a long time and presented an inter-

esting and puzzling clinical picture. As Dr. Ayer has said, we see cases every now and again of increased intracranial pressure with spontaneous remission of symptoms in which the diagnosis remains doubtful. Here we have an example of one condition which can behave in that way.

At autopsy there was a cavity filled with about 25 cc. of brownish red hemorrhagic fluid outside the dura at the site of the old right temporal exploration. Microscopical examination disclosed an angiomatous formation of large thin walled blood vessels, with old and recent hemorrhages in the surrounding tissues. There were also small clusters of similar vessels in the subarachnoid space in other places, and most of the superficial cerebral veins were enlarged and tortuous. There was old hemorrhage in one of these angiomatous lesions situated in the left Sylvian fissure. There were numerous connecting branches between the abnormal vessels and veins, but no connection with arteries could be demonstrated. I should suppose that these lesions represent developmental anomalies and not true neoplasms. They may increase in size some what through enlargement of existing small vessels, which are usually very numerous. Hemorrhages probably explain the acute episodes.

DR. VIETS: Was there any hypertrophy of the heart or aorta?

DR. KUBIK: The autopsy was restricted to the head.

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CASE 26052

PRESENTATION OF CASE

A sixty-four-year-old businessman was admitted complaining of regurgitation of food.

Ten years before entry after eating fish chowder, the patient became ill for a period of three days with nausea and vomiting. Ever since he had been troubled by a varying degree of regurgitation of liquids and less frequently of solid foods. This generally occurred at night after he had been in bed for two or three hours and rarely occurred during the day. Fluid always came up easily without nausea or effort and did not seem to come from the stomach. There was no blood. Regurgitation consisted of about a mouthful at a time and gradually progressed to the point where it occurred each night but caused no outstanding discomfort. Four or five years before entry he undertook a course of physical exercise, Swedish massage and self-imposed diet which caused his weight to decrease from 193 to 174 pounds. These meas-

ures had been adopted because the patient had felt under par and had been quite dyspneic with exertion. Subsequently he was very much relieved, although the regurgitation continued. One year before entry he had a slight cough productive of watery sputum. Although the acute phase persisted for only two or three days the productive cough continued throughout the entire winter. Four months before entry he contracted another cold and discovered that he had lost about 15 pounds during the preceding month. Regurgitation became slightly more frequent, and he developed a cough productive of about a pint of watery frothy sputum daily. There was never any blood or grossly purulent or fetid material in the sputum. At about that time there was an afternoon rise in temperature to 100 or 101°F, and both the cough and fever continued until entry. There was some constipation, and the patient was troubled by hemorrhoids. His appetite became quite poor. Cold liquids caused immediate regurgitation, but hot liquids did not. He frequently regurgitated brownish salty liquid in the morning on waking. Two months before entry he was confined to bed for four weeks because of afternoon fever and a physician told him there was consolidation of the left lower lobe, which cleared up in a week or two. Associated with this illness during the few months before entry there was some hoarseness, which varied in intensity, and the cough gradually became brassy in character. X-ray examination four and a half months before entry showed a soft-tissue mass behind the middle portion of the heart in the posterior mediastinum. This was almost round in shape and produced a pressure defect in the medial aspect of the lower esophagus, which was adherent to the mass. Barium entered the region of this mass through a 2-cm opening from the esophagus and filled a fairly round cavity, within which were large filling defects, particularly at its lower posterior portion. Some of the barium flowed from this cavity into a more irregular one in the lateral part of the soft-tissue mass, and from there, small quantities trickled through a minute opening into one of the minor bronchi of the left lower lobe. The remainder of the gastrointestinal tract showed no evidence of disease. There was no obstruction in the esophagus. Examination of the chest showed normal diaphragmatic position and movement. There was incomplete aeration in the medial part of the left lower lobe, and some questionable dilatation of the bronchi in this region. There was no shift of the mediastinum.

Physical examination showed a well-developed but poorly nourished man who appeared to have

lost considerable weight. Examination of the mouth and pharynx was negative. There was slight pallor of the mucous membranes. The maximum apex impulse of the heart appeared to be slightly displaced toward the midline, although the position was not stated. The sounds were regular and of good quality. No murmurs were heard. The blood pressure was 105 systolic, 60 diastolic. The lungs were clear and resonant anteriorly. In the lower third of the left chest posteriorly there were fine crepitant rales and slight dullness with moderate diminution in intensity of the breath sounds.

The temperature was 97.6°F, the pulse 104, and the respirations 32.

Examination of the urine was negative. The blood showed a red-cell count of 4,600,000 with a hemoglobin of 70 per cent, and a white-cell count of 14,500 with 83 per cent polymorphonuclears. A single sputum specimen was copious, thin and watery, no blood was present, and examination for tubercle bacilli was negative. Several stool specimens gave negative reactions to the guaiac test. A blood Hinton test was negative.

X-ray examination showed that the soft-tissue mass previously described in the lower end of the esophagus had slightly increased in size. Ulceration within it had extended considerably and reached almost to its lateral wall. The cavity was connected with the lower end of the esophagus, but no barium could be observed to enter into the bronchial tree. The pressure defect in the esophagus was more marked, and there was delay, but no definite stenosis, at the lower end of the esophagus. The appearance of the left lower lung field had not changed appreciably since the last observation.

During the patient's stay in the hospital he remained afebrile and moderately comfortable. Each day he brought up 200 to 300 cc of thin watery, frothy sputum, which at times was slightly blood tinged. He had no pain. While in the hospital, pneumothorax was produced artificially in the left pleural cavity, and on four occasions 400, 600, 800 and 700 cc of air were introduced. The intrapleural pressure remained negative. The patient's sputum decreased considerably in amount after this, and he seemed to cough much less.

After discharge from the hospital the patient's condition gradually grew worse, with brief periods of temporary improvement. His cough increased in frequency and productivity, and he lost strength and appetite. He continued to be able to get down a fair amount of liquid food, however, although he vomited about twice daily. The vomitus consisted of watery material and

mucus but no occult blood and varied from a quart to a quart and a half in amount. His weight decreased about 2 to 4 pounds each week and, at the time of his death, had dropped to about 70 pounds. For two months he was unable to rise from bed and for the last two weeks unable to swallow anything. He died five and a half months after his discharge, about ten and a half years after the onset of his illness.

DIFFERENTIAL DIAGNOSIS

DR. ALLEN G. BRAILEY The diagnostic problem in this case has to do with the nature of the mediastinal mass. The earliest symptom which may have been related to this mass was regurgitation which began ten years before entry, when the patient was fifty-four years old and which persisted to the end. The next symptom which may throw light on the nature of the mass was slight cough, which began one year before entry. Then four months before entry, the patient discovered that he had lost 15 pounds of weight and that he had a little fever. He became constipated and lost his appetite. From then on his course was steadily downhill. In the hospital he was found to have consolidation of the lower lobe of the left lung which was promptly explained by the demonstration of a fistulous tract between the lower esophagus and the left lower bronchus.

Fistulas between the esophagus and a bronchus or the esophagus and the trachea are usually due to carcinoma. Less often they are caused by tuberculosis and rarely they represent minor developmental defects, not incompatible with life. In this case there was no evidence of fistula prior to one year before death and nothing to suggest tuberculosis. Apparently the sputum was examined only once for tubercle bacilli; none were found and I think there is very little likelihood that this fistulous tract was due to tuberculosis. On the other hand his progressive downhill course, his rapid loss of weight and the ragged, irregular appearance of the tract by x-ray are at least consistent with the symptoms and signs of neoplasm. I believe this fistula extended through cancer tissue and that the cancer probably arose at the esophageal end where the bulk of the abnormal tissue is shown by x-ray to be situated.

While it seems impossible not to believe that this man had a cancer nevertheless there are some serious objections to this diagnosis. It does not satisfactorily explain the whole of this ten year period of disability, for it is not credible that he could have had a cancer of the esophagus ten years before entry to the hospital of sufficient size to cause regurgitation and yet have remained in

essentially good health until a few months before death. We are furnished with the suggestion that this difficulty with regurgitation began shortly after a meal of fish chowder. There may be fishbones in fish chowder and one may have lodged in his esophagus. So far as I can find, one of three things may happen to a fishbone so lodged. It may dislodge itself and go on into the stomach. Or it may require removal by esophagoscopy. Or it may penetrate the esophagus and set up an acute mediastinitis. But it could never cause the chronic symptoms of mild obstruction such as occurred here over a nine year period. Partial stricture of the esophagus could have caused this long history of regurgitation and have provided the nidus for the later development of cancer. This is a real possibility and I cannot rule it out, but it is subject to the objection that we know of no cause for such a stricture, such as the swallowing of caustics. If it was a congenital stricture why did he have no symptoms prior to fifty years of age?

There remains another possibility, namely that the patient may have had a diverticulum of the esophagus. On studying the x-ray plates it is easy to follow a rounded outline which would do very well for the as yet undestroyed wall of a large diverticulum. A diverticulum of this size is undoubtedly a pulsion diverticulum since traction diverticula (caused by adhesion with tuberculous lymph nodes) are usually only a few millimeters deep. Those of the pulsion variety are much commoner in the upper esophagus at its junction with the hypopharynx. Their etiology is not wholly settled, but it is thought that they develop at points of congenital weakness in the muscular wall through which the esophageal *mucosa* gradually pouches outward. They may enlarge very slowly, and they cause no symptoms until they become so large and empty so poorly that they kink or distort the esophagus. Such kinking pulls the mouth of the diverticulum more and more into line with the esophageal lumen and causes the pouch to fill with increasing ease. Its pull and pressure help to close off the lower portion of the esophagus, and symptoms of obstruction with the regurgitation of recently swallowed food appear.

In conclusion then I think that this patient died of carcinoma of the esophagus which had communicated with the left lower bronchus and set up a chronic pneumonitis of the left lower lobe. It is at least a reasonable hypothesis that this cancer arose in an esophageal diverticulum which he had had for years and which had caused symptoms for about ten years.

DR AUBREY O HAMPTON I can add nothing to the x-ray description Dr Brailey has made the same interpretation on the x-ray films as we did Stricture of the esophagus is ruled out by the absence of obstruction to the flow of barium Food particles in a diverticulum can also be ruled out because the filling defect did not shift in position or change much in shape The small fistulous tract demonstrated at the first examination is seen on only one or two of the films Only a very thin, thread-like stream of barium passed into one or two of the smaller bronchi, and this was not present on the second examination The opening from the esophagus into the large rounded cavity is quite typical of that of a diverticulum

CLINICAL DIAGNOSIS

Carcinoma arising in diverticulum of esophagus

DR. BRAILEY'S DIAGNOSES

Carcinoma of esophageal diverticulum, with invasion of left lower bronchus
Tracheobronchial fistula
Chronic pneumonitis

ANATOMICAL DIAGNOSES

Epidermoid carcinoma of diverticulum of the esophagus, with invasion of hilus of left lung
Esophageal obstruction
Emaciation
Bronchiectasis, right lower lobe, slight
Pulmonary atelectasis
Pericarditis, acute fibrinous, localized
Pleuritis, acute fibrinous, localized

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY The autopsy findings bear out almost point for point Dr Brailey's predictions We found a large diverticulum of the

lower end of the esophagus communicating, through a perfectly smooth opening, with an otherwise normal esophagus Some little distance from its mouth the walls of the diverticulum became granular, thick and indurated, obviously carcinomatous Anteriorly the tumor had spread by direct extension into the hilus of the left lung We were unable at autopsy to demonstrate the bronchial fistula, but the history definitely suggests that this closed some time before his death The bronchi of the left lower lobe showed moderate but not great dilatation and only moderate inflammatory reaction I think we must make a diagnosis of bronchiectasis, but I do not believe that the cupfuls of watery sputum which the history mentions could have been raised from these bronchi and it is more probable that the "sputum" represented discharge from the diverticulum through the fistula

Another point of interest is the question of esophageal obstruction It is quite clear from the history, as Dr Brailey pointed out, that for many years after the onset of symptoms of regurgitation there was no obstruction This only developed in the last year of life One might easily have guessed that it resulted from extension of the carcinoma to the esophagus proper This was not the case, however, and the obstruction must have been due either to external pressure or to kinking, as Dr Brailey suggested

The tumor was a remarkably well-differentiated, very slowly growing epidermoid carcinoma, certainly not above Grade I in malignancy It is probable that it had been present much longer than the acute symptoms would indicate Despite its extension into the hilar tissues it had not metastasized even to the regional bronchial and mediastinal nodes

Except for incipient terminal pericarditis and pleuritis there were no other anatomical findings of significance

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MASSACHUSETTS PUBLIC HEALTH ASSOCIATION

At the call of Dr. Lemuel F. Woodward, then chairman of the Worcester Board of Health, thirty five men representing the State Board of Health and twenty four local boards gathered at the old Revere House in Boston, on January 11, 1890, and officially organized the Massachusetts Association of Boards of Health. They elected as their first president Dr. Henry P. Walcott, chairman of the State Board of Health, and as first vice-president Dr. Samuel H. Durgin, chairman of the Boston Department of Health. This was the second state association formed in America, New Jersey being first, and its fiftieth anniversary, to be celebrated on January 27, is a significant occasion.

The date, 1890, in many respects marks the division between the old and the new in public-health practice. Bacteriology had become a well-established

science with its several specialized applications in medicine, sanitation, agriculture and industry, the causes of many of the important epidemic diseases had been discovered, the basic principles of immunity were being formulated, and the bacteriology of water, sewage and milk was being developed. The Massachusetts Drainage Commission, consisting of such men as Hiram F. Mills, William T. Sedgwick, Thomas M. Drown, Allen Hazen and Edwin O. Jordan, was particularly influential in this latter field, while at the Massachusetts Institute of Technology some of the earliest work on the bacteriology of milk was being done.

It was, therefore, most fitting that at just this time a few people with vision saw the value and importance of forming an association of persons engaged in public health work who could discuss together matters of sanitary interest, who would formulate and enforce legislation, and who could, through their professional relations, come to know one another and to exchange ideas regarding the mutual problems they met as local health officers or board members.

The association soon invited persons of less exclusive administrative interests but of a wide training and vision to join with them, and the early roster of membership included Charles V. Chapin, Samuel C. Prescott, C. E. A. Winslow, George C. Whipple, Dr. Theobald Smith, Dr. Hibbert W. Hill, Dr. Milton J. Rosenau and others whose names are well known in the annals of public health progress. These men brought to the meetings a breadth of scientific knowledge and training which immediately gave progressive leadership to the group.

Each important forward step in public health during the past fifty years gained impetus through the meetings of the association. The subjects considered dealt with live current problems, and the speakers were usually leaders in their fields. One can trace in the proceedings the campaign for safe milk, including the early work done on bacteriological examination, epidemiological studies proving the importance of milk in the spreading of disease, the practice of pasteurization and the supporting legislation to bring about more ade-

quate milk control Professor Sedgwick was the leader in these discussions, ably supported by Dr Smith and Chapin Every step in the control of diphtheria, from the value of laboratory examinations as aids in diagnosis to the most recent immunization practices, is reflected in the records Without the medium of the association for discussing and urging the successive steps in the use of antitoxin and in active immunization with toxin-antitoxin mixtures and then toxoid, we may fairly assume that there would have been more lag between knowledge and application Chapin's advanced thinking on the importance of contact infection and the uselessness of terminal fumigation is apparent in the records "It is personal rather than municipal cleanliness that health officers must teach," he insisted

The association began the publication of a quarterly journal, known as the *Journal of the Massachusetts Association of Boards of Health*, in 1901 This daring and ambitious undertaking was justified, for it was the parent of the present *American Journal of Public Health*, the official organ of the American Public Health Association The transfer took place in a series of steps and was completed in 1911, when the name of the state association disappeared from the title Dr Hill and Burt R Rickards were the first managers and editors of the journal, and Rickards continued for five years as managing editor of what was then called the *Journal of the American Public Health Association*

The first twenty-five years of the history are the most spectacular because of the extraordinary events that were happening in the field of public health However, the association has continued to have the same general significance down to the present time In 1933, a new constitution was drawn up by a committee of which Dr George H Bigelow was chairman The reorganization provided for three sections a health-officers' section, a laboratory section and a child-hygiene section In 1936, the name was changed to the more appropriate Massachusetts Public Health Association

The association will undoubtedly accomplish as much during the next fifty years as it has in the past fifty years There is still much to be done in

advancing the well-being and comfort of the people and in preventing and alleviating sickness The more spectacular things may have been achieved, but there remains the necessity of eternal vigilance in all measures concerning sanitation and preventive medicine, and there is the same call for leadership and co-operation as there was in 1890

COMMUNITY FUND CAMPAIGN

Most local physicians are well acquainted with the vital community services that are made possible by Greater Boston's Community Fund They know that the various agencies supported by the Community Fund carry on work for humanity which must be done—and that if this work is to be accomplished the annual campaign must be successful

It is significant that every year the scope of the Fund has broadened In 1940 more than one hundred and seventy-five hospitals and health and social-service agencies will have Community Fund support, as compared with one hundred and fifty last year, and the campaign will cover Boston and forty-five surrounding cities and towns

The 1940 goal is \$4,625,000 Though this is \$125,000 more than has ever before been raised, it represents the absolute minimum required to carry on the vital human services through the year In order to attain—and, if possible, to exceed—this goal, the time and effort of more than sixteen thousand unpaid volunteer workers have been enlisted Among them are leading business and professional men and women from all walks of community life

The 1940 quota for the Physicians' Group is \$21,000 Since the 1940 goal, however, is set to meet only the barest minimum requirements, every quota must be oversubscribed The physicians have regularly done more than their share in the past and, with their first-hand knowledge of human needs, they will probably repeat during this campaign, which extends from January 22 through February 6

Chairman of the Physicians' Group is Dr Theodore L Badger He is assisted by the following vice-chairmen Dr Perry C Baird, Jr, Dr Ran-

dolph K. Byers, Dr Earle M. Chapman, Dr E. Stanley Emery, Jr., Dr Thomas H. Ham, Dr Alfred O. Ludwig, Dr Archie A. Abrams, Dr Lendon Snedeker, Dr William B. Stevens and Dr Conrad Wesselhoeft. It is also of interest that a member of the medical profession, Dr Thomas R. Goethals, is the 1940 chairman of the Professional Division.

The theme of the 1940 Community Fund Campaign is built around the life and ideals of Abraham Lincoln, which were typical of this great enterprise by the people and "for the people" of Greater Boston. Its purpose is to teach hope to all, despair to none of the three hundred thousand people who need help each year. The fullest support of all physicians and other public spirited men and women in Greater Boston is vital to the 1940 Community Fund Campaign.

MEDICAL EPONYM

ARTIUS PIENOXENON

Maurice Arthus read a paper at a meeting of the Biological Society in Marseilles on June 16, 1903, entitled "Injections Répétées de Sérum de Cheval chez le Lapin [Repeated Injections of Horse Serum in the Rabbit]." This was published in the *Comptes rendus hebdomadaires des séances et mémoires de la Société de biologie* (55: 817-820, 1903). The translation of a portion of the paper is as follows:

If sterile horse serum (our experiments were made with antitoxic serums) is injected under the skin, into the peritoneum or into the veins of a rabbit, whether the serum be fresh or preserved heated to 57 C. or not heated, no primary or late injury will be produced. Horse serum is not toxic for rabbits. If after an interval of a few days this injection of horse serum is repeated, one may state that after several injections, it will produce, even in small doses, injuries which are mild or severe according to the degree of preparation of the animal and which according to the route of introduction, may be either local or general immediate or delayed. Horse serum is toxic for rabbits which have been rendered anaphylactic by and to horse serum.

Does the human being develop a similar anaphylactic state with local or general injuries similar to those described in the rabbit, under the influence of repeated injections of serum?

Quoting instances of apparent reactions of this type in human beings, the author concludes that such a state does exist, a conclusion which the observations of others have confirmed.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D. Secretary
330 Dartmouth Street
Boston

FATAL PUERPERAL SEPSIS FOLLOWING FORCEPS DELIVERY

Mrs. J. B., a twenty-seven year-old primipara, was admitted to the hospital February 1, 1912, in active labor. The expected date of confinement was February 8, the last menstrual period having ceased May 1, 1911. The past and family histories were not recorded.

Examination on entry revealed a vertex presentation in an ODP position. The pelvic measurements were normal. The head was engaged. The temperature was 98°F., and the pulse 80.

After nineteen hours of labor the cervix became fully dilated. Because of lack of further progress a forceps delivery was performed. The patient was anesthetized with ether. After manual rotation of the baby's head, the forceps was applied as for an ODA position. Moderate difficulty was experienced in pulling the head down onto the perineum. Although the color of the baby was normal at birth, it did not breathe and all attempts at resuscitation failed. The mother's condition after delivery was excellent. A one degree laceration of the perineum was sutured with silk worm gut.

On February 4, forty hours after delivery the patient's temperature rose to 102.8°F., and the pulse to 120. The temperature remained elevated throughout the day and at 9 p.m. the pulse rate was 130. There were marked tenderness and spasm on both sides of the uterus. An intrauterine douche of salt solution was given, followed by one of alcohol. She was placed in Fowler's position and ice-caps were applied to the lower abdomen.

The following day the patient's general condition was definitely worse. There were marked tenderness and spasm throughout the lower abdomen. Distention was somewhat relieved by enemas, turpentine stupes and flaxseed poultices.

The patient rapidly failed. Abdominal distention increased, and there was suggestive intra-abdominal fluid. The pulse rose to 160, and the respirations to 50. A throat culture revealed streptococci and staphylococci. Uterine and blood cultures were not taken. She lapsed into coma and

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

died on the tenth postpartum day. An autopsy was not obtained. The discharge diagnoses were streptococcal tonsillitis, general peritonitis and septicemia.

Comment This septic case is characteristic of those which occur during hospital epidemics. Only one patient of the next five who were delivered escaped the infection, and one of these, the fifth, also died. Strict isolation is the only way to treat this type of puerperal infection. If this cannot be obtained, further admissions to the hospital should be canceled.

The routine treatment in 1912 was intrauterine douches, with or without curettage. In this case no curettage was performed. Douches have no effect on a generalized infection, and they are never used today. It is perfectly possible that, if sulfanilamide had been known and used, this patient might not have succumbed.

ANNUAL PRIZE FOR INTERNS

The attention of interns in Massachusetts hospitals is called to the fact that a prize of \$50.00 has been offered by the Massachusetts Medical Society for the best written and most comprehensive case report submitted by one of their number holding an internship in any Massachusetts hospital which is approved by the American Medical Association for intern training during 1938-1940.

This report is to be typewritten, and when completed is to be sealed, unsigned, in a plain envelope, which in turn is to be placed together with a separate slip bearing the name and address of the contestant, in a larger envelope, and sent to Committee on Medical Education and Medical Diplomas, Massachusetts Medical Society, 8 Fenway, Boston.

The contest this year closes May 5, 1940. Reports may be submitted at any time prior to that date.

DEATHS

BERRY—CHARLES F. BERRY, M.D., of Boston, died October 10, 1939. He was in his sixty-ninth year.

Dr. Berry received degrees from the College of Physicians and Surgeons, Boston, in 1899 and from the College of Physicians and Surgeons, Baltimore, in 1910. He was a member of the Massachusetts Medical Society and the American Medical Association.

LOBO—JOSE P. LOBO, M.D., of Providence, Rhode Island, died November 28, 1939. He was in his sixty-third year.

Dr. Lobo received his degree from the Universidade de Lisboa Faculdade de Medicina, Portugal, in 1900.

He was a fellow of the Massachusetts Medical Society and the American Medical Association.

NEW HAMPSHIRE MEDICAL SOCIETY

DEATH

LAKE—ELMER E. LAKE, M.D., of Hampstead, died at his home on December 6, 1939. Dr. Lake had practiced in Hampstead for forty-seven years.

He was born in East Haverhill, Massachusetts, December 10, 1861, the son of Morris and Eunice (Duff) Lake, and was graduated from the University of Vermont in

1892. During the World War he served as medical examiner at Fort Preble, Maine, at Camp Eustis, Virginia, at Freeport, Maine, and at Fort Williams, Maine, being promoted to a captaincy in February, 1918, which commission he held at the time of his death.

Dr. Lake was a member of the New Hampshire Medical Society and the Rockingham County Medical Society.

He is survived by his widow, Mrs. Mary E. Lake, two sons, Albert C. Lake, of Hampstead, and Morris E. Lake, of Montpelier, Vermont, and a daughter, Mrs. Eunice Sharpe, of Salem, Massachusetts.

HENRY H. AMSDEN, *Necrologist*

MISCELLANY

GENITAL TUBERCULOSIS

Tuberculosis in the male genital organs is believed to be secondary to some other tuberculous focus in the body, most commonly in the lung. Though the prognosis is discouraging and the treatment far from satisfactory, much progress has been made in this field in recent years. Miller and Lustok published a paper (*Genital Tuberculosis* J A M A 113 1388-1394, 1939) based on their observations of 61 male patients with genital tuberculosis, an abstract of which follows.

* * *

At the Sanatorium of the Jewish Consumptives Relief Society, 61 (47 per cent) of 1316 male patients admitted in an eleven year period had genital tuberculosis.

Genital tuberculosis may occur at any age but the vast majority of patients range from twenty to forty years. The younger the patient the more virulent the infection. Genital tuberculosis is secondary to some other tuberculous focus in the body, usually the lungs. Ninety-five per cent of these patients had associated far-advanced pulmonary tuberculosis and 87 per cent had sputum with tubercle bacilli. The infection may reach the genital tract by way of the blood stream, by way of the lymphatics and, secondarily, by continuity of tissue. The seminal vesicles and prostate are the primary seats of the genital tuberculous infection (though the epididymes give more pronounced symptoms) and also the foci from which the bladder and kidneys in many cases are affected.

Pathogenesis

There are two general theories concerning the pathogenesis of tuberculosis of the male genital tract.

1 That the prostate and seminal vesicles are involved primarily in the genital system and that the disease may remain localized or spread as descending genital or ascending renal tuberculosis.

2 That the prostate and seminal vesicles are involved secondarily from other urogenital organs by dissemination through the lumens or walls of hollow viscera connecting them—ascending genital or descending renal tuberculosis.

The authors believe that the disease most frequently starts in the vesicles and prostate but may occasionally start in the epididymes and that the mode of infection is primarily hematogenous.

Diagnosis

The difficulty in accurate diagnosis of the scrotal and prostatic masses has been emphasized frequently, yet the chief underlying cause is incomplete investigation.

The only method available for the examination of the prostate and seminal vesicles is palpation with the finger in the rectum. In the early stages of the disease no change may be demonstrable by this means of examination, but

in the vast majority of cases definite signs are present. Irregular firm but not stony-hard nodules in the prostate recognized by means of touch indicate extensive involvement of this organ. Likewise when the seminal vesicles are felt as pencil like bands, extending in an upward and outward direction from the upper margin of the prostate, extensive involvement of these organs is indicated.

Examination of the external genitalia is best done with the patient in a standing position facing the surgeon. Observations are made of alterations in the normal rugose appearance of the skin of the scrotum the shape of the testicles and their relative position in respect to each other. Changes in the scrotal skin are sometimes a valuable guide, as shown by a smoothing out of the rugae and a warting of the cellular tissue immediately beneath the dermis. Adhesion of the skin to the epididymis is a well-known sign, as is also a sinus discharging creamy pus. A comparison of the mobility of the two testicles is sometimes helpful. A normal organ can be moved freely within its covering particularly in the upward and downward direction. This movement is often restricted when tuberculosis of the genital organs is present. In the early stages a soft or even fluctuant mass at the site of the epididymis and involving it is present in a large percent age of cases. If untreated it will result in ulceration and formation of a chronic sinus discharging pus or it will become a hard fibrotic or calcific mass. Late in the disease the epididymis may entirely lose its identity or, if it can be palpated, will be craggy and nodular. The vas becomes thickened and has beadlike prominences.

Classification

Genital tuberculosis has the same pathological characteristics as tuberculosis elsewhere in the body and a discussion of it must take into consideration the clinicopathological type of tuberculosis, as is done by the phthisiologist in classifying pulmonary tuberculosis. The authors have classified their cases into three groups: catarrhal, 8 cases ulcerative 21 cases and fibroid, 32 cases.

Prognosis

The prognosis of genital tuberculosis does not depend entirely on the prognosis of the associated pulmonary lesion, as the authors discovered by comparing their series of cases with a comparable series of cases of pulmonary tuberculosis without genital involvement. In fact, the presence of genital tuberculosis adds considerably to the gravity of the general disease and shortens the life expectancy. At the end of a one to eleven-year period of observation, only 34 per cent of the authors' patients were alive.

Treatment

The surgical treatment recommended varies from a careful resection of the infected focus to the complete removal of the seminal tract. The immediate mortality rate of radical surgical management, the persistent draining sinuses that are frequent sequelae of such intervention and the false rationale of removing a single focus and leaving the primarily infected prostate, have placed this form of therapy in general disrepute among phthisiologists and urologists versed in the management of tuberculosis.

The beneficial effect of ultra violet therapy in extra pulmonary tuberculosis has been well known for many years. It is logical to choose a form of therapy which will lend itself to sharp localization to the desired areas that is, the prostate, the seminal vesicles and the epididymis, thus producing the maximum local effect without doing any general harm. Irradiation of the epididymis alone

has been common practice among the men who advocate this form of physical therapy for genital tuberculosis. It is the authors' belief that if radiation were given with equal intensity to the prostate and seminal vesicles, the most frequent primary seat of tuberculous infection in the genital tract, the result would be more certain and more rapid and reactivation would be less likely to occur.

The authors describe at some length their method of applying light therapy by means of the cold quartz lamp and report encouraging results in the treatment of the catarrhal and ulcerative types.—Reprinted from *Tuberculous Abstracts* (January 1940)

CORRESPONDENCE

HEALTH SERVICE, INCORPORATED

To the Editor In Boston we are soon to practice medicine in competition with a lay organization known as Health Service, Incorporated, which hires as employees the Medical and Surgical Associates. Health Service, Incorporated has already begun to solicit various groups to persuade them to allow the Medical and Surgical Associates to give them medical care. As a practitioner of medicine cannot ethically solicit patients it seems unfair for this lay organization to do so.

This is undoubtedly undermining one of the corner stones of medical ethics which has helped to keep American medicine an honored profession in the past. I believe this situation deserves a protest.

DAVID W. SHERWOOD, M.D.

66 Commonwealth Avenue,
Boston.

NOTICES

BOSTON DISPENSARY

The annual meeting and banquet of the medical staff of the Boston Dispensary will be held at the Boston City Club 14 Somerset Street, on Tuesday evening, January 23 at 6.30.

JOINT MEETING

The Boston Tuberculosis Association, the Southern Middlesex Health Association and the Trudeau Society of Boston are holding a joint meeting on Thursday January 25 at the University Club 40 Trinity Place, Boston.

The Boston Tuberculosis and Southern Middlesex Health associations will have their business meetings with election of officers at 4.30 and 5 p.m. followed by a dinner at 6 p.m. which will be attended by members of the three organizations. Dr. Edward G. Huber will speak on "Tuberculosis as a Future Public Health Problem."

At 8.15 p.m., Dr. Chevalier L. Jackson of Philadelphia will address the Trudeau Society on "The Role of Bronchoscopy in the Diagnosis and Treatment of Thoracic Disease." Discussion will be opened by Drs. Edward B. Benedict and Reeve H. Betts.

Physicians are cordially invited to attend.

MOSES J. STONE, M.D. Secretary
Trudeau Society

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday January 24 from 2 to 4 p.m. Drs. John Romano and Elliott C. Cutler will speak on "Fits." A clinicopathological confer

ence conducted by Dr Elliott C Cutler will take place from 4 to 5 p.m.

On Thursday, January 25, from 8 30 to 9 00 a.m. there will be at the Peter Bent Brigham Hospital, a combined clinic, conducted by Dr Elliott C Cutler, of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend

BOSTON DOCTORS' SYMPHONY ORCHESTRA



The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concert-master with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every

Thursday at 8 30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430)

MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday, January 30, at 5 00 p.m.

PROGRAM

Studies on the Peripheral Circulation with the Rein Thermostromuhr Dr R. R. Linton
Circulating Thyroglobulin in Normal Individuals and in Those with Thyroid Disease Dr J. Lerman
Antiphagocytic Property of Human Serum Dr C. Lyons

HENRY K. BEECHER, M.D., *Secretary*

SUFFOLK DISTRICT MEDICAL SOCIETY

There will be a meeting of the Suffolk District Medical Society at the Boston Medical Library, 8 Fenway, on Wednesday evening, January 31, at 8 15.

PROGRAM

Certain Features of the Water and Salt Exchange Dr James L. Gamble.
Variability of the Clinical and Hemolytic Manifestations of Leukemia in Childhood Dr Louis K. Diamond
Blood Ascorbic Acid Concentrations in Terms of Plasma, Red Cells and White Cells Dr Allan M. Butler
The Criteria for Ligation of the Patent Ductus Arteriosus in the Light of the First One and a Half Years' Experience Drs John P. Hubbard and Robert E. Gross.

MILTON H. CLIFFORD, M.D., *Secretary*

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

The following talks will be given in the auditorium of the Joseph H. Pratt Diagnostic Hospital during the week of February 4:

Monday, February 5, at 4 30 p.m. Cancer of the Stomach Dr George Pack, of the Memorial Hospital, New York City

Thursday, February 8, at 4 30 p.m. Tumors of the Bone. Dr Bradley Coley, of the Memorial Hospital, New York City. Discussion by Drs Channing C. Simmons and Howard M. Clute. Reticulum-cell Sarcoma of Bone. Dr Channing C. Simmons

Physicians are cordially invited to attend these lectures

ARLINGTON AND BELMONT MEDICAL CLUBS

A combined meeting of the Arlington and Belmont medical clubs will be held at Ring Sanatorium and Hospital, on Friday evening, January 26, at 8 15.

A report on "Mental Problems of Mid-Life: A study of one hundred cases at the Ring Sanatorium and Hospital" will be given by Drs Curtis T. Prout and Albert U. Bourcier. Discussion by Drs Ezekiel Pratt and Frank J. Fleming will follow.

MICHAEL F. NIGRO, M.D., *Secretary*,
Arlington Doctors' Club

BENJAMIN SPRITZ, M.D., *Secretary*,
Belmont Medical Club

MASSACHUSETTS PUBLIC HEALTH ASSOCIATION

In celebration of its fiftieth anniversary the Massachusetts Public Health Association is holding a dinner at the Parker House, Boston, on Saturday evening, January 27, at 7 00. Dr Charles-Edward A. Winslow, School of Medicine, Yale University, will be the guest speaker. His subject will be "A Half Century of Public Health."

Physicians are cordially invited to attend (dress optional). Tickets, at two dollars apiece, can be obtained by applying to the secretary, G. Donald Buckner, 69 Coolidge Avenue, Needham, Massachusetts.

MASSACHUSETTS PSYCHIATRIC SOCIETY

The next meeting of the Massachusetts Psychiatric Society will be held at the Boston Psychopathic Hospital on Thursday evening, January 25, at 8 00.

PROGRAM

Infectious Processes in the Causation of Mental Deficiency Dr Clemens E. Benda
Physiologic Aspects of Schizophrenic Withdrawal Drs A. Angyal, H. Freeman and R. G. Hoskins.

W. FRANKLIN WOOD, M.D., *Secretary*

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Beth Israel Hospital, Monday, January 29, at 8 15 p.m.

PROGRAM

Logarithmic Recording: A standardized method for studying heart sounds. Drs Joseph E. F. Riseman and M. Rappaport.
The Mechanism and Significance of the Action of Paredrine on the Veins. Dr Arnold Iglauer.
The Degree of Latent Edema After Recovery from Congestive Failure. Dr Mark D. Altschule.
Clinical and Pharmacological Observations in Paroxysmal Ventricular Tachycardia. Dr Harry Linenthal.
The Significance of Deep S₂ in the Electrocardiogram. Drs Louis Wolff and Max J. Klainer.

Observations on the Cardiac Complications in Patients Dying in Shock. Dr Paul M Zoll.

The Effect of Nitroglycerin and Theobromine Sodium Acetate on the Electrocardiogram During Exertion in Patients with Angina Pectoris. Dr A Stone Freidberg.

The Degree of Myocardial Fibrosis as Estimated Chemically by the Collagen Content Results and Interpretations. Drs Dorothy R Gilligan and Herrman L Blumgart.

Interested physicians and medical students are invited to attend.

EDWARD F BLAND M.D. *Secretary*

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The next meeting of the New England Society of Physical Medicine will be held at the Hotel Kenmore, Boston, on Wednesday evening January 24. The council will meet at 6:00 there will be an informal dinner at 6:30.

Dr A. Philip Mooradian of New York City will speak on the subject, "Comparative Physics of Long Wave and Short-Wave Diathermy Generators." A question period will follow.

All members of the medical profession are cordially invited to attend.

WILLIAM D McFEE, M.D., *Secretary*

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, JANUARY 21

SUNDAY JANUARY 21

4 p.m. What about Sulfisilamide? Dr Chester S. Keeler. Free public lecture. Harvard Medical School amphitheater of Building D.

MONDAY JANUARY 22

American Academy of Orthopaedic Surgeons. Hotel Statler Boston.
12:15-1:15 p.m. Clinicopathological conference. Dr S. Bert Wolfbach. Peter Bent Brigham Hospital amphitheater.

TUESDAY JANUARY 23

American Academy of Orthopaedic Surgeons. Hotel Statler Boston.
9-10 a.m. X-ray Clinic: Presentation of Cases. Dr A. Ertlinger. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12:30 p.m. Boston Dispensary tumor clinic.
12:15-1:15 p.m. X-ray conference. Dr Merrill C. Bowman. Peter Bent Brigham Hospital amphitheater.
6:30 p.m. Medical staff of Boston Dispensary. Boston City Club.
8:15 p.m. Boston Lying-in Hospital. Journal Club.

WEDNESDAY JANUARY 24

American Academy of Orthopaedic Surgeons. Hotel Statler Boston.
9-10 a.m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
12 p.m. Clinicopathological conference. Children's Hospital amphitheater.
2-4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.
6 p.m. New England Society of Physical Medicine. Hotel Kenmore.

THURSDAY JANUARY 25

American Academy of Orthopaedic Surgeons. Hotel Statler Boston.
8:30-9:30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital at the Peter Bent Brigham Hospital.
9-10 a.m. Otolaryngology Clinic: Presentation of cases. Dr P. L. Metzger. Joseph H. Pratt Diagnostic Hospital.
4:30 p.m. Boston Tuberculosis Association. University Club.
6 p.m. Southern Middlesex Health Association. University Club.
8 p.m. Massachusetts Psychiatric Society. Boston Psychopathic Hospital.
8:15 p.m. Trudeau Society of Boston. University Club, 40 Trinity Place, Boston.

FRI. & JANUARY 26

9-10 a.m. Peritoneoscopy in Diagnosis of Abdominal Tumors. Dr W. E. Garrey. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12:30 p.m. Boston Dispensary tumor clinic.

5 THURSDAY JANUARY 27

9-10 a.m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12 m. Medical staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Soets Weiss.
p.m. Massachusetts Public Health Association. Parker House, Boston.

Open to the medical profession

JANUARY 19—Staff meeting. United States Marine Hospital. Page 99 issue of January 4.

JANUARY 21—Free public lecture. Harvard Medical School. Page 1042 issue of December 25.

JANUARY 21—Salem Hospital public lecture. Page 1041, issue of December 28.

JANUARY 21—Free public lecture. Quincy City Hospital. Page 77 issue of January 11.

JANUARY 22-25—American Academy of Orthopaedic Surgeons. Hotel Statler Boston.

JANUARY 23—Boston Lying-in Hospital. Page 77 issue of January 11.

JANUARY 23—Medical Staff Boston Dispensary. Page 121.

JANUARY 24—Joint medical and surgical clinic. Peter Bent Brigham Hospital. Page 121.

JANUARY 24—New England Society of Physical Medicine. Notice above.

JANUARY 25—Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Page 121.

JANUARY 25—Joint meeting of Boston Tuberculosis Association, the Southern Middlesex Health Association and the Trudeau Society of Boston. Page 121.

JANUARY 25—Massachusetts Psychiatric Society. Page 122.

JANUARY 26—Arlington and Belmont Medical Club. Page 122.

JANUARY 27—Massachusetts Public Health Association. Page 122.

JANUARY 29—New England Heart Association. Page 122.

JANUARY 30—Massachusetts General Hospital. Page 122.

FEBRUARY 5—Cancer of the Stomach. Dr George Pack. Joseph H. Pratt Diagnostic Hospital. Page 122.

FEBRUARY 8—Tumors of the Bone. Dr Bradley Coley. Joseph H. Pratt Diagnostic Hospital. Page 122.

FEBRUARY 8—Fremont Association of Physicians. 8:30 p.m. Hotel Barden Haverhill.

FEBRUARY 11-14—International College of Surgeons. Page 759 issue of November 9.

FEBRUARY 22-24—American Orthopaedic Association. Page 957 issue of December 14.

MARCH 2, JUNE 8 and 10—American Board of Ophthalmology. Page 719 issue of November 2.

MARCH 7-9—The New England Hospital Association. Hotel Statler Boston.

APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond Virginia.

MAY 10-18—American Scientific Congress. Page 1043, issue of December 28.

MAY 14—Pharmacopoeial Convention. Page 894 issue of May 25.

JUNE 7-9—American Board of Obstetrics and Gynecology. Page 1019 issue of June 15.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

FEBRUARY 14—Cough, Sputum, Hemoptysis—How shall they be investigated? Dr. Reeve H. Betts. Essex Sanatorium, Middleton.

MARCH 6—Experimental and Clinical Considerations of Sulfisilamide Treatment of Hemophilic Streptococcal Infections. Dr. Champ Lyons. Lynn Hospital, Lynn.

APRIL 3—Addison Olcott Hospital, Olowee.

MAY 8—Annual meeting. Salem Country Club, Peabody.

HAMPSHIRE

JANUARY 23—Page 77 issue of January 11.

HAMPSHIRE

MARCH 13

MAY 8.

Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital Northampton.

MIDDLESEX EAST

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Union Country Club Stoughton.

MIDDLESEX NORTH

JANUARY 31
APRIL 24
JULY 31
OCTOBER 30

NORFOLK

JANUARY 30 — Page 77 issue of January 11

NORFOLK SOUTH

FEBRUARY 1
MARCH 7
APRIL 4
MAY 2

All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon

PLYMOUTH

MARCH 21 — Goddard Hospital Brockton.
APRIL 18 — State Farm
MAY 16 — Lakeville Sanatorium Lakeville.

SUFFOLK

JANUARY 31 — Scientific meeting Page 122
MARCH 27 — Scientific meeting Symposium on Ulcerative Colitis and Diarrheas Under the direction of Dr Chester M Jones
APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

WORCESTER

FEBRUARY 14 — Worcester State Hospital
MARCH 13 — Worcester Memorial Hospital
APRIL 10 — Worcester Hahnemann Hospital
MAY 8 — Worcester Country Club

Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

Hospital for the Ruptured and Crippled A historical sketch written on the occasion of the seventy-fifth anniversary of the hospital Fenwick Beekman. 157 pp New York Ruptured and Crippled Hospital, 1939 \$3.00

Minor Mental Maladjustments in Normal People Based on original autobiographies of personality maladjustments J E Wallace Wallin 298 pp Durham Duke University Press, 1939 \$3.00

Climate and Evolution William D Matthew Second edition. 223 pp New York The New York Academy of Sciences, 1939 \$2.00

The Diagnosis and Treatment of Diseases of the Esophagus Porter P Vinson 224 pp Springfield, Illinois, and Baltimore Charles C Thomas, 1939 \$4.00

The New International Clinics Original contributions, clinics and evaluated reviews of current advances in the medical arts Edited by George M Piersol Vol 4, N S 2. 339 pp Philadelphia, Montreal, and New York J B Lippincott Co, 1939 \$3.00

Speech Correction Principles and methods C Van Riper 434 pp New York Prentice-Hall, Inc, 1939 \$2.50

Harvey Cushing's Seventieth Birthday Party, April 8, 1939 Speeches, letters and tributes Published for the Harvey Cushing Society 146 pp Springfield, Illinois Charles C Thomas, 1939 \$3.00

Biological Products Louis Gershenfeld 236 pp New York Romaine Pierson Publishers, Inc., 1939 \$4.00

Population Race and Eugenics Morris Siegel 206 pp Hamilton, Ontario published by the author, 1939 \$3.00

One Way of Living James Bridie. 299 pp London Constable & Co, Ltd, 1939 8s 6d

Love Problems of Adolescence Oliver M Butterfield. 212 pp New York Emerson Books, Inc., 1939 \$2.25

BOOK REVIEWS

Thus We Are Men Walter Langdon-Brown 344 pp. New York Longmans, Green & Co, 1939 \$3.50

The author has collected papers from many sources and reproduced them in book form. He was formerly the professor of physic at the University of Cambridge and, for many years, physician to St. Bartholomew's Hospital. Many of these papers have appeared in medical journals. They deal with a wide variety of topics, mostly of a historical or philosophical nature. There are two short interesting biographies, one of Robert Bridges and the other of William Osler. Other distinctly medical topics deal with the background of Harvey, the plague of England and the evolution of death. All are written in a pleasant, easy style. The wide learning of the author is everywhere in evidence. He does not write in the modern popular manner, but nevertheless these essays are extremely valuable for the physician and the more informed of the lay public. The high literary standards of the English physician are upheld by this book.

The New International Clinics Original contributions, clinics and evaluated reviews of current advances in the medical arts Edited by George M Piersol Vol 3, N S 2 332 pp Philadelphia, Montreal and New York J B Lippincott Co, 1939 \$3.00

Leading off with an excellent summary of the salient facts regarding peripheral vascular disease, this volume continues with a carefully chosen group of articles too numerous to mention individually. The subjects covered are diverse, and the manner of presentation is of high caliber. Some of the articles are eminently practical, such as one concerning the surgical treatment of hemorrhoids, others, such as one discussing studies on leukemia, delve into the experimental aspects.

Sleep and Wakefulness As alternating phases in the cycle of existence Nathaniel Kleitman. 638 pp Chicago The University of Chicago Press, 1939 \$5.00

The author of this book, now associate professor of physiology at the University of Chicago, offers students a stimulating and critical account of sleep and wakefulness. The discussion is chiefly limited to the contributions which have been made since the appearance in 1912 of Pierson's book, *Le Probleme Physiologique du Sommeil*. The author's own interest and work in this field of investigation date from 1921. He has been led to evolve what he terms the evolutionary theory of sleep and wakefulness, a concept which involves the organism as a whole and is in contrast to the previously held theories, such as the neural, the humoral or the combination of both, the neural and the humoral. The book is divided as follows: Part I, "Functional Differences between Wakefulness and Sleep", Part II, "The Course of Events during the Sleep Phase of the Cycle", Part III, "Periodic Characteristics of Both Phases of the Cycle", Part IV, "Interference with the Sleep-Wakefulness Cycle", Part V, "Spontaneous Changes in the Sleep-Wakefulness Cycle", Part VI, "Means of Influencing the Sleep-Wakefulness Cycle", Part VII, "States Resembling Sleep", Part VIII, "Theories of Sleep".

There is an excellent bibliography which covers 72 pages and contains 1434 references. Author and subject indices follow.

This book is a valuable contribution to the subject, and students of biology will read it with much profit.

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THROMBOPHLEBITIS AND ITS PULMONARY COMPLICATIONS*

LEWIS A. CONNER, M.D.†

NEW YORK CITY

THE presentation before this assembly of a paper bearing the above title must seem to you very much like carrying coals to Newcastle, in view of the very important contributions made to that subject by a distinguished member of your own body, Dr. John Homans. These contributions have been marked by a clarity and sanity that have set them quite apart from much of the voluminous literature that has gathered about this subject.

It seems somewhat strange that I should again at this time, be discussing the perennial topic of thrombophlebitis, for most of my experience was gained, and my writing done, over a ten year period beginning thirty five years ago. That was a time when typhoid fever was still one of the great scourges of the country, and anyone in charge of an active medical hospital service had all too many opportunities to become familiar with thrombophlebitis as it was seen in that disease. Although I have, of course, seen many cases of venous thrombosis since that time, what I have to say is based largely on my experience in studying many hundreds of cases of typhoid fever during that period. Just how far the experiences with thrombosis as a complication of typhoid fever can be carried over to other forms of thrombophlebitis is perhaps a question, but I have a strong conviction that, along with obvious differences, there are a good many resemblances between the picture of venous thrombosis as seen by the surgeons, the gynecologists and the obstetricians, and that so commonly met with as a complication of typhoid fever. It is only because of that conviction that I venture to bring this subject before you today.

First, a word must be said about terminology. I shall assume that the terms "thrombophlebitis" and "venous thrombosis" can be used interchangeably, although obviously that should not be the

case, they should have a quite different connotation, but the difficulties of making a sharp distinction between the two conditions are so great as to be almost insuperable. Many cases which seem to begin as a pure thrombosis, with no evidences of inflammation of the vein wall, later, somewhere along the course of the vein, show unmistakable signs of phlebitis and periphlebitis. Again, there may be the frank signs of phlegmasia alba dolens in one leg, with extensive signs of periphlebitis while later in the other leg the evidences of thrombosis may appear without any of the usual signs of inflammation.

Before attempting to discuss the clinical aspects of venous thrombosis, and more especially the preventive aspects, which have for us by far the greater interest, it is necessary that we have a clear understanding of the structure and mode of formation of such thrombi and so at the risk of being tedious I must review some of the more essential of the known facts.

If a typical completed thrombus, such, for example as is found in the femoral vein be examined macroscopically, it is seen to be a cylindrical plug, often many centimeters in length which has been likened to appearance to a serpent. The short proximal portion or head is of white or grayish color, and has a somewhat conical extremity, the intermediate portion or neck is of mixed whitish and red color, whereas the most distal portion or tail is a deep red and has the appearance of a postmortem clot. This red tail usually makes up much the largest part of the thrombus. It has long been firmly established that the head or white portion of the thrombus represents its primary and essential part and that the red terminal portion is secondary and, as it were, purely incidental. The structure of the white thrombus is therefore of special interest.

Without attempting a detailed description it may be said that this primary part of the thrombus is composed almost wholly of blood platelets or

*Presented at the New England Postgraduate Assembly, Cambridge, Massachusetts, October 31, 1939.

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thrombocytes, which have been deposited on the vein wall by the flowing blood, and have been built up into a complicated structure resembling the intricate branching of coral, until gradually the vein lumen has become occluded.

In the interstices of this structure of platelets are to be found leukocytes and a few red cells, but fibrin, the characteristic element of blood coagulation, is almost wholly lacking. When this white thrombus has occluded the vein and blood has ceased to flow, there is then formed behind it the red, coagulated mass which makes up the tail. The platelet thrombus is firmly cemented to the vein wall by a process of agglutination, whereas the friable red thrombus has little or no such attachment.

These distinctions between the primary process of thrombosis and the secondary one of blood coagulation behind the thrombus are vital to an understanding of the subject.

This simple form of completed thrombus, however, is by no means the only one. In many cases—in most cases, perhaps—there is continued propagation of the thrombus centrally by repeated deposits of masses of agglutinated platelets, with intervening areas of red clot. When, as is usual, the proximal end of the thrombus is formed by the firmly adherent platelet thrombus, the chances of a large pulmonary embolus are small, but when in the stagnant blood between the proximal end of the thrombus and the next entering branch above a loose and fragile red clot is formed, this may extend for some distance into the blood stream above the entering branch, and be broken away and carried into the pulmonary arteries. Homans¹ believes these propagated red clots to be the source of most of the fatal pulmonary emboli.

I shall not burden you with a detailed consideration of the various causes of thrombosis. These have recently been discussed by Homans¹ with commendable clearness and conciseness. It is unquestionably true, as Aschoff said long ago, that thrombosis is "the function of a number of variables." Variations in blood flow, both general and local, changes in the composition of the blood and changes in the vein wall all doubtless play their part, although in varying degrees of importance.

With respect to the first of these sets of causes, variations in blood flow, I am strongly of the opinion that the general slowing of the blood current, as seen in many diseases of the heart, is a far less important factor in producing venous thrombosis than are the local disturbances of blood flow in the veins themselves. The beautiful experimental work of Aschoff and his associates² has shown the importance of eddies and aberrant

currents in the veins in determining the sites at which the deposition of platelets begins, and such eddies and aberrant currents, when associated with local slowing of the venous blood stream, as the result of long-continued recumbent posture, absence of muscular contraction and perhaps pressure upon the veins from any one of several causes, seem to me to constitute the important causal factors in most of the thromboses which form in the veins of the lower extremities.

The role played by changes in the composition of the blood is still obscure, in spite of the vast amount of study that has been given to such changes. Dehydration, from any of the many possible causes, is perhaps the one most likely to be significant and the one most easily understood. Of late, much stress has been laid on the importance of an increase in the tendency to coagulation among the factors predisposing to venous thrombosis, and clinical means for measuring that increased tendency have been devised³, but the significance of an increase in the coagulability of the blood as a predisposing cause can hardly be looked upon as fully established, and there seem to be such theoretical difficulties in accepting that view that I believe we should still exercise some reserve concerning it.

It would seem plausible to expect that an increase in the number of blood platelets in the circulating blood might well predispose to venous thrombosis, but no such relation between an increase in the platelets and a tendency to thrombosis has ever been found.

It is obvious that in many cases changes in the vein wall from trauma or infection must be of paramount importance among the factors leading to thrombosis. Homans⁴ has made the important suggestion that in the characteristic and severe form of phlegmasia alba dolens which complicates childbirth and infections within the pelvis, the involvement of the femoroiliac vein may result from infection along the lymphatics from the pelvis, with first a lymphangitis about the femoral vessels and only secondarily an involvement of the vein itself. However, among the large group of medical forms of thrombosis it is difficult to see how changes in the vein wall can play any thing but a very minor etiologic role.

Turning now to my experiences with venous thrombosis in typhoid fever,⁵ this complication was found to occur so frequently among the typhoid patients at the New York Hospital as to attract the attention of everyone on the medical service. It was then found that, by careful daily examination of the lower extremities of every typhoid patient throughout the course of his disease, it was possible to recognize a beginning thrombosis, often

many days before the classic symptoms of femoral thrombophlebitis appeared, and to recognize also many minor forms of thrombosis that never at any time developed the picture of phlegmasia alba dolens. It soon became quite apparent that the usual statistical figures for the complication of venous thrombosis in typhoid fever, 2 or 3 per cent. were far too low, and that the true incidence of the complication was probably not less than 10 per cent.

This daily routine examination of the legs of the typhoid patients revealed that almost invariably the thrombotic process began somewhere below the knee. Most frequently the first signs appeared deep in one or both calves with pain or soreness on stretching of the calf muscles, a small area of tenderness, with or without induration, or slight localized edematous swelling. Much less frequently the signs first appeared in the foot, with tenderness and perhaps induration either about the heel or deep in the sole. Often these signs were so equivocal that it was impossible to be sure that they indicated a thrombosis until more characteristic signs appeared either in the leg or thigh. One striking feature of the small early thromboses of the legs—a feature which seems to mark most forms of venous thrombosis—was the rarity with which the subcutaneous veins became involved. Aside from a few cases in which the long saphenous vein became affected, the process was confined almost exclusively to the deep veins.

The progress of the clinical signs of most of these thromboses was upward, the first signs appearing in the calf or foot, later with the signs indicating the involvement of the popliteal vein and finally with the signs of a full-blown phlegmasia alba dolens, affecting the femoral vein alone or the femoral and iliac veins. Not all cases, however, showed this tendency toward upward extension of the thrombosis to the femoral vein. In a considerable number the process seemed to confine itself entirely to the veins in the lower leg. Only rarely did signs of femoral thrombophlebitis appear as the first evidence of thrombosis. Another point of interest relates to the occurrence of extensive periphlebitic inflammation. When this was found it seemed always to be the final phase of the process of thrombosis, and one got the impression (it never was more than an impression) that pronounced periphlebitic inflammation and induration occurred only after the vein had become completely occluded.

The time interval between the first signs of thrombosis in the calf or foot and the frank signs of femoral thrombophlebitis varied greatly, it might be only two or three days but it might, on

the other hand, be as long as three or four weeks.

Marked edematous swelling of the thigh and leg was by no means a very common symptom, even when the signs indicated the involvement of the femoral vein, and when present such swelling appeared usually only in connection with pronounced signs of phlebitis and periphlebitis.

In studying the symptom of fever in the cases of thrombophlebitis complicating typhoid fever, there were certain obvious difficulties. Often the fever of the disease itself had not altogether subsided before the signs of thrombosis appeared, and there was besides the possibility that any existing fever might be caused either by a relapse or by some other complication. However, it was found after the study of a great many temperature charts that the fever curve in uncomplicated typhoid fever had a very characteristic and uniform type and even though it varied widely in its duration and height the same was true also for the relapses. No matter whether they were mild or severe they showed the same periods of gradual ascent, of continuous elevation and of gradual decline.

When the temperature charts of the cases complicated by venous thrombosis were studied it was found that some post typhoid febrile movement was present in almost all the cases. In a majority of the cases the temperature rose with the appearance of the signs of thrombophlebitis in a large vein. Often however the fever began several days or even longer before any of the usual signs of thrombosis had appeared. The height of the fever, as well as its duration and its time of appearance, showed every possible variation. In a number of the cases there was fever for some days preceding the appearance of the signs of thrombosis but none afterward. In others the temperature rose only after the thrombosis had been manifest for several days. In a good many of the cases, after the period of typhoid defervescence had become nearly or quite complete, the temperature would rise again and then run a long and irregular course, in the midst of which at some time, appeared the signs of thrombosis.

It is my hope that the above mentioned facts concerning the clinical picture of venous thrombosis as it appears in typhoid fever may to some extent at least, be applicable to venous thrombosis as it is seen by surgeons and obstetricians.

I come now to two bizarre symptoms which in the study of 1540 cases of typhoid fever were found to be so frequently associated with the signs of venous thrombosis that one could not but feel that the relation must be something more than a purely fortuitous one.* They are mentioned here on the chance that rarely perhaps, they may be encountered in other forms of thrombophlebitis. I

refer to the symptoms known as "post-typhoid chills" and "tender toes"

One of the less common but well-recognized complications or sequels of typhoid fever was the obscure, multiple chills which occasionally marked the period of convalescence. Such abrupt rises of temperature and rigors might occur almost daily for two or three weeks without obvious cause, either at the time or afterward. They were usually referred to as manifestations of "post-typhoid sepsis," although there were no other evidences of sepsis and although their course was invariably benign. In the above series of typhoid-fever cases such obscure, late, multiple chills occurred in 20 patients. In 16 of these there were well-marked signs of thrombophlebitis, and in every one of the 4 cases in which no signs of thrombophlebitis were observed, there were pulmonary symptoms strongly suggestive of pulmonary embolism. These recurring chills bore no constant time relation to the appearance of the symptoms of venous thrombosis. Very often the chills occurred some days or even two or three weeks before the signs of thrombosis in the legs appeared. At other times the chills occurred simultaneously with the signs of thrombosis. At times the chills synchronized with the signs of pulmonary embolism, but frequently there was no such recognizable relation. Just what the significance is of these multiple chills I do not know, but that they have some relation to the process of venous thrombosis is, I think, beyond question.

The obscure condition of painful and exquisitely tender toes has long been known as an occasional complication of typhoid fever, and appears late in the disease or during convalescence. It was commonly regarded as a neuritis of the plantar nerves, although in many cases the transient character of the symptoms made it seem unlikely that an actual neuritis existed.

In the series referred to, this complication occurred in 22 cases. In 12 (55 per cent) of these there was also the complication of thrombophlebitis of the legs. Of the 10 cases of tender toes in which venous thrombosis was not recognized, there were 7 which at the time of the tender toes showed an irregular and unaccountable post-typhoid febrile movement, and in 1 of the remaining 3 cases there were the symptoms of pulmonary embolism. These facts are at least very suggestive of some connection between thrombosis involving the legs and the mysterious symptoms of tender toes. It is unlikely that thrombosis and inflammation of the small veins of the foot should themselves produce the symptoms, but it seems reasonable to suppose that a thrombosis

of one or more veins about the heel and the subsequent periphlebitic inflammation might in some cases be sufficient to irritate, or even to cause inflammation of, the plantar nerves which lie in such close contact with the arteries and their venae comites.

These features of the clinical course of venous thrombosis as seen in typhoid fever have been discussed at length only in the hope that they may throw some light on those forms of thrombosis that are of such importance at the present time, for typhoid fever is now so rare that its complications hold little interest for us.

The postoperative forms of thrombosis have always been regarded as being especially characterized by their tendency to run a latent and silent course. Whether that belief is justified, I do not know, but it seems to me possible that the careful daily examination of the lower extremities of postoperative patients, from the time of their operation onward, might occasionally reveal evidences of early thrombosis in the calves or feet some days before a femoral thrombosis had declared itself by the occurrence of a fatal pulmonary embolism. I need hardly add that such examinations of the legs, if attempted, should be carried out with the utmost gentleness and caution.

In view of the various other symptoms which were found so often associated with venous thrombosis in typhoid fever, it seems possible too that the presence of a febrile movement for which there is no satisfactory explanation might, at times, furnish the correct clue. It is hardly necessary to say that any sudden pulmonary or pleural symptoms, however soon they may appear after operation or childbirth, should be looked upon with the utmost suspicion. Whether the two strange symptoms of recurrent chills and tender toes, which seemed to bear some relation to venous thrombosis in the typhoid patients, ever have their counterparts in the thrombophlebitis cases of the present day, I should be greatly interested to know.

Thus far nothing has been said concerning what is after all the most important group of symptoms associated with thrombophlebitis—those related to the lungs. An analysis of the large series of typhoid cases referred to showed that in 88 cases there had been pulmonary or pleural complications (exclusive of bronchitis), which in 25 cases were almost certainly not of an embolic nature. Of the remaining 63 cases it was believed that most if not all were those of pulmonary embolism, although in some of these cases no other evidence of venous thrombosis had been recognized.

The custom of making a sharp distinction between the type of massive embolism which usu-

ally results fatally and the far commoner type of minor embolism with infarction is, I think, fully justified. Among our typhoid patients such fatal attacks occurred only three times, and in each case only late in the course of the venous thrombosis and only after there had been earlier mild attacks. On the other hand, the small embolic attacks were vastly commoner, were frequently multiple and occurred much earlier in the course of the thrombosis. In two thirds of the cases these embolic attacks occurred before any local signs of thrombophlebitis had appeared, the interval between the two groups of symptoms being anywhere between two or three days and two weeks or more. I⁶ have supposed that these early and small emboli were derived from the freshly forming mural thrombus before the vein is occluded and while the blood is still flowing in it. That is the time when the thrombosis usually gives no local symptoms, and is the time also when one would naturally expect small clumps of agglutinated platelets to be washed away into the venous blood stream. Indeed, it is hard to understand how a gradually forming thrombus can avoid giving off such small and early emboli. These early embolic attacks, occurring before the local signs of thrombophlebitis, were described by Vaquez⁷ almost half a century ago.

The late, massive emboli I have always believed were the result of the dislodgment of a large portion of the completed thrombus, which for some reason had not become firmly fixed to the vein wall. It may well be, however, as Homans¹ thinks, that many such emboli are due to a loosely attached red clot which has formed in advance of the platelet thrombus. Certainly when there are distinct evidences of phlebitis and periphlebitis the risk of detachment of the thrombosis seems very remote. Barker and Counseller⁸ state that in a series of 116 fatal cases of embolism from post-operative thrombophlebitis the latter was recognized before death in only 5 cases. In 4 of these cases autopsy revealed that the thrombus was intact in the leg in which it had been recognized during life and that the fatal embolus had come from an unrecognized thrombus in the other leg.

It is unnecessary to discuss at length the symptoms of pulmonary embolism and infarction. Their severity is, of course, determined chiefly by the size of the infarct.

Pleural pain is usually the first, and is much the most constant, of all the symptoms. In many of the cases its location along the margin of the ribs or at the top of the shoulder suggests that the infarct is at the diaphragmatic surface of the lung. A good many of the emboli are so tiny and lodge so close to the surface of the lung that the resulting

infarct is too small to be detected by physical signs or even by an x-ray film. In such cases the only signs may be those of a very transient dry pleurisy.

In the case of larger infarcts there may be the signs of a circumscribed area of consolidation or of an extensive fibrinous pleurisy.

Bloody sputum, the presence of which is so often looked upon as essential to the diagnosis of pulmonary infarction, is by no means a constant symptom. It occurred in less than half our typhoid cases of embolism. Even when it is present it may not appear until three or four days after the onset of the symptoms. In only a small percentage of the cases is the onset of the attack marked by a chill, and the elevation of the temperature is often less marked and less protracted than one might reasonably expect from the severity of the other symptoms.

We come now to the all important questions of prevention and treatment, and here I speak with much less confidence than I did when discussing the clinical picture of the disease.

In the case of the typhoid patients we were dealing with severely ill and prostrated people who often had lain for several weeks flat on their backs, with the legs fully extended and with almost complete lack of the important aid to venous circulation that is furnished by muscular contraction. In many of the patients also there must have been a state of severe dehydration.

The fact that thrombosis almost always began in the veins of the calf or foot suggested that there might be some special interference with the venous return just above these points, and led me to wonder if in these outstretched legs the tension of the deep popliteal fascia might not offer some additional impediment to venous return by compressing the popliteal vein which lies directly beneath it. It must be admitted that the simple procedure of elevating the foot of the bed as a prophylactic measure in all the typhoid cases did not seem to occur to anyone. The patients were, however, encouraged to change their position in bed, to move their limbs freely and to keep the knees partly flexed.

The importance of the lack of muscular contraction in favoring thrombosis seemed to me so great that once when one of the interns became ill of typhoid fever I was led to propose to him that he might perhaps lessen the chances of thrombosis by light exercise of his arms and legs at frequent intervals every day. He was eager to follow my suggestion and as he was not too ill to do so, these daily exercises of his arms and legs were continued through most of his illness. Unfortunately he was a conscientious lad and the exercises were carried out only too faithfully and energetically.

To my great embarrassment he developed an extensive thrombophlebitis, first in one arm, then in the other and finally in both legs. It was, I think, the most extensive involvement of the veins that I have ever seen. Just what conclusion should be drawn from this experience I have never quite known, but at all events it effectually dampened my enthusiasm for muscular exercise as a preventive measure.

In the management of postoperative patients there is the growing conviction that the time to employ preventive measures against thrombosis is the period immediately after the operation rather than a week or two later. That conviction is, I think, fully justified, for in many cases, at least, thrombosis is a gradual process which has its beginning much earlier than might be supposed. Elevation of the foot of the bed to hasten venous return from the legs, the avoidance, so far as possible, of everything that increases intra-abdominal pressure, the stimulation of active diaphragmatic breathing movements and the replacement of losses of body fluids are all measures which are reasonable and practicable and which deserve to be employed. Whether an increased tendency to blood coagulation predisposes to thrombosis and

whether, if that be the case, such a tendency can be effectively controlled, as Bancroft and his associates³ believe, by diet or drugs I do not know. Certainly much the most promising of the newer measures to prevent thrombosis is the use of the purified preparations of heparin, not because it is an effective anticoagulant, but because it has been shown in a very striking way by Best and his colleagues⁹ to be capable in experimental animals of preventing the formation of the platelet thrombi. What the value of this method, and what the limitations of its usefulness may prove to be as a routine measure in postoperative cases, can only be determined by further experience.

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EXSTROPHY OF THE BLADDER AND EPISPADIAS*

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THREE years ago we¹ presented before this society the results of our operative treatment of exstrophy of the bladder. The data were based on a study of 15 patients, and we emphasized the following points:

A three-stage operation.

The transplantation of the right ureter first, and the left two to four weeks later.

The transperitoneal approach for the ureterosigmoidostomies, leaving no catheter or guides, but having the proximal end of the ureter opened widely by a longitudinal split.

No drainage of the peritoneal cavity.

Removal of the bladder as soon as is practicable after the ureteral transplants.

The operation to be performed, preferably, between three and five years.

In the last three years there have been 7 addition-

al cases, making a total of 44 ureterosigmoidostomies in 22 patients with exstrophy of the bladder which we have performed without mortality. This is good evidence that the guiding principles set forth in our previous paper are sound. Not only has there been no mortality, but the functional results have been satisfactory in the cases observed to date. We have been greatly pleased by the later follow-up study of some of our earlier cases. Intravenous pyelograms taken six or seven years after the original transplantations have shown little if any evidence of dilatation of the ureters or kidney pelves in a satisfactory number of cases. It is also interesting to note that some of the cases have shown rather more dilatation of the ureters and kidney pelves during the first two years after the transplantation than they have subsequently. It is possible that the dilatation shown during the first six to eighteen months after operation may be explained on the basis of a physiologic readjustment to the transplantation.

Our previous paper and most of the other recent papers in the literature on exstrophy of the bladder have concentrated on the diversion of the

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urinary flow into the bowel. Comparatively little attention has been paid to the remaining factors in the problem. These factors are removal of the pouting exstrophied bladder, which is unsightly and uncomfortable, cure of the ventral hernia, which is always present, plastic reconstruction of the urethra with possible restoration of sexual function, and cosmetic improvement, which is important psychologically, particularly in the male.

One of us (W.E.L.) has devised the following method which satisfactorily solves the above parts

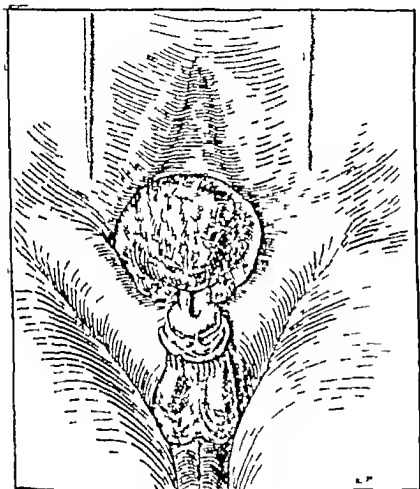


FIGURE 1

Shows exstrophy of the bladder subsequent to ureteral transplants but before any operative procedure for the epispadias

of the problem. No particular claim for originality in principles is made for this operation, but rather it is an adaptation and combination of the principles used by others into a single operation which yields gratifying results. The use of the foreskin for the outer skin layer covering the newly made urethra is based on the practice of Ombredanne in the treatment of hypospadias, and is somewhat similar to that of Luhmann² in the treatment of epispadias, but the details of our technique are quite different from either of these.

At a suitable time after the ureters have been transplanted, usually three to five weeks, the cystectomy and repair of the epispadias and ventral hernia are undertaken. It should be remembered, however, that this third step requires a rather long anesthesia and is accompanied by an appreciable,

though seldom dangerous, amount of hemorrhage. It should never be done, therefore, unless the patient has fully recuperated from the previous ureterosigmoidostomies. In certain cases the child may well be sent home for a period of weeks or months to recuperate. This is often time well spent, for the child can lead a much more normal and active life than he could before the ureteral

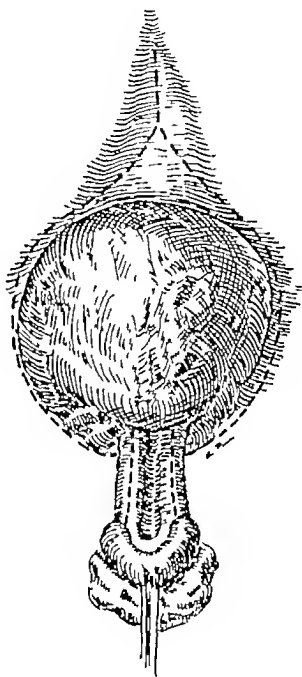


FIGURE 2

Shows incision for the operation

transplants. Also, he usually acquires urinary control during this period, which makes the convalescence from the third operation much more comfortable.

OPERATION

Under Avertin, nitrous oxide and oxygen, and ether anesthesia, the patient is prepared and draped. The exstrophied bladder is cleaned with soap and water and then with alcohol. The surrounding skin of the abdomen, and of the genitalia in boys, is prepared with one-third strength iodine solution.

Figure 1 shows the appearance of the male patient before operation. Note the urethral groove, the prepuce, which is hooded on the under side of the glans penis, and the wide separation of the two recti muscles.

Figure 2 shows the line of incision for the cystectomy. It should come a little to the outer side of the junction of the mucous membrane and the skin. At the upper end it should be carried still farther away from the mucous mem-

moving the bladder mucous membrane and folding over the flap of rectus fascia to cure the ventral hernia, and closing the subcutaneous fascia and skin in the midline. In boys, the plastic repair of the epispadias is now undertaken.

Figure 4 shows the bladder mucous membrane still attached at the base in the region of the verumontanum. The dotted line shows the incisions that are made to construct an oblong flap of mucous membrane with its hinge at the base

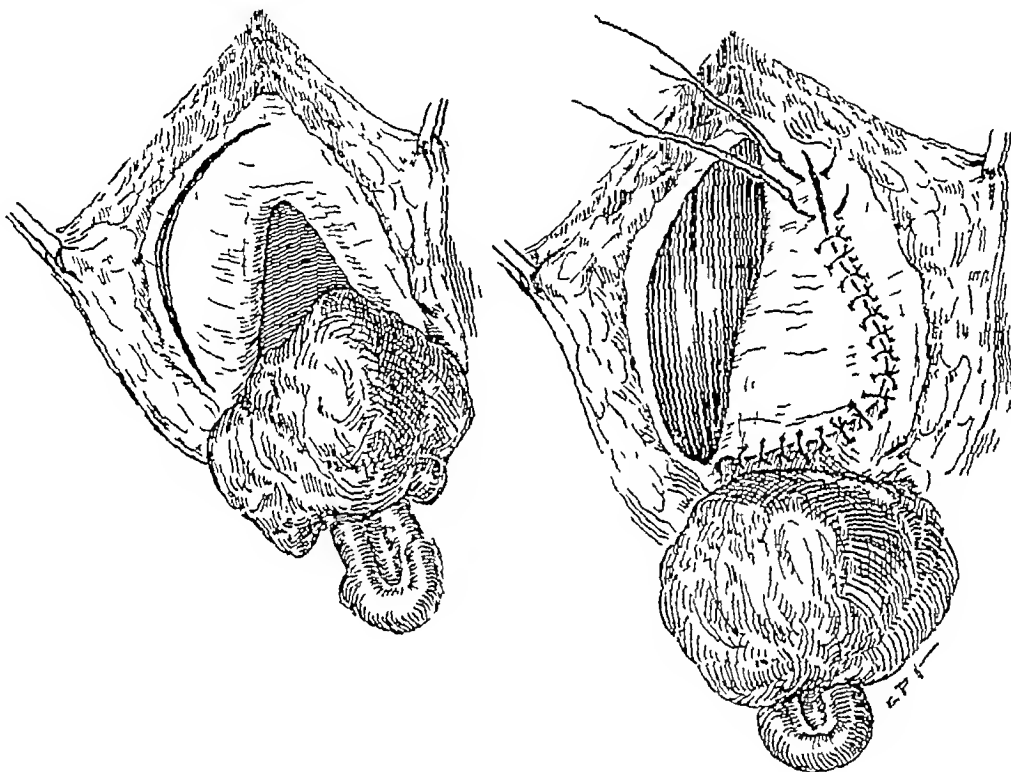


FIGURE 3

Shows the bladder freed and turned down, and the method of closing the ventral hernia with the fascial flap

brane of the bladder until the two lateral incisions meet at a point above the site of the navel.

Figure 3 shows the bladder almost entirely resected. It also shows how a large, generous flap of fascia from the right rectus muscle is made and then turned across to the opposite side to close the triangular defect in the anterior abdominal wall. Particular caution must be used in dissecting the bladder mucous membrane at the upper third, for it is here that it is very easy to enter the peritoneum. Should this misstep be made, the peritoneum should be closed at once with plain catgut. We have had no ill effects in the cases where the peritoneum has been accidentally opened. This method of removal of the bladder mucous membrane and repair of the abdominal wall defect is the same in both sexes. In girls the operation is completed by entirely re-

moving the bladder mucous membrane and folding over the flap of rectus fascia to cure the ventral hernia, and closing the subcutaneous fascia and skin in the midline. In boys, the plastic repair of the epispadias is now undertaken.

Figure 5 shows the various steps in making the mucous-membrane roof to the urethra and the method of covering it with the split prepuce. Figure 5₁ shows the mucous-membrane flap being turned forward, and Figure 5₂ its suture to the incision previously made on either side of the urethral groove. Figure 5₃ shows the prepuce being split by blunt dissection through the incision previously made around and beneath the glans. Figure 5₄ shows the prepuce split

and turned outward with the raw surface presenting, and the roughly triangular incision through which the glans is drawn. Figure 5a shows the glans after it has been pulled through the preputial flap, *ACBC* and how the flap is

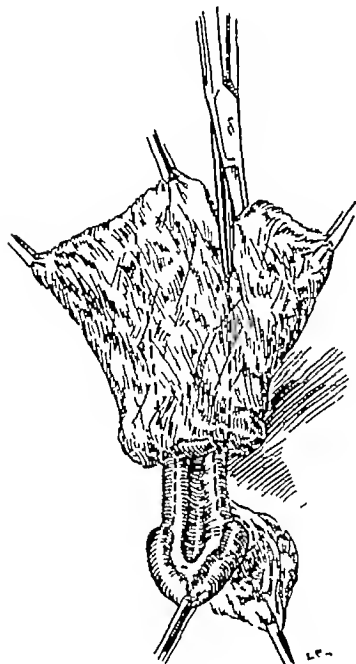


FIGURE 4

Shows the flap of bladder being cut to form the roof of the new urethra

utilized to cover the roof of the urethra. Point *A* of the flap is sutured to the bottom of the incision, closing the anterior abdominal wall. This point is at the base of the shaft of the penis. Interrupted sutures are then placed on either side running up to points *C* in Figure 5b. Thus firmly anchors the preputial flap on the raw surface of the previously made urethral tunnel. Figure 5c shows the last step, which consists in suturing the hole made in the preputial flap to the cut surface of the incision about the corona, and to the distal end of the mucous membrane flap which forms the roof of the urethra. This last step can be better visualized by saying that it is very similar to the row of sutures used in performing an ordinary circumcision. Figure 6 shows the operation completed.

On completion of the operation, it will be seen that there is some redundant tissue from the preputial flap. Its appearance has been described as dog-eared. It is better to postpone further plastic work intended to reduce the tissue for a number of months or years, as it tends to disappear with time.

When properly done, the operation has relatively little chance of failure. The chief danger,

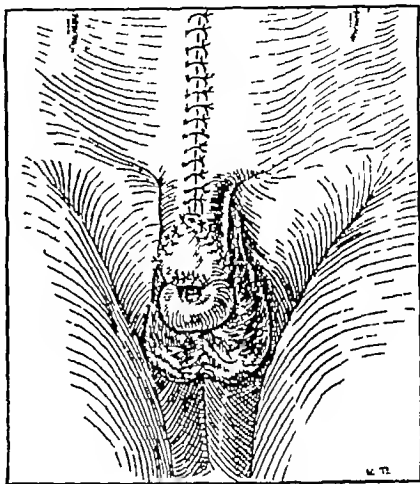


FIGURE 6.

Shows the completed operation

of course, is that of infection, but this can be minimized by proper technic. The passage of urine is obviously not a factor.

This type of operation results in a very much stronger abdominal wall, and in correcting the epispadias it creates a passage, which should remain patent, from the ejaculatory ducts to the end of the penis. As to how successful the function will be, of course, cannot now be answered. It is our intention to follow these cases for a number of years, to do further plastic procedures if necessary as the size of the organ grows, and to correct, if necessary the redundancy of the preputial flap, though this redundancy is much less noticeable a few months after operation. Of particular interest to us will be a trial, as the patient approaches puberty, of the various preparations of sex hormones which apparently are effective in increasing the size of the organ.

While the functional result must remain in doubt, we believe that this operation is an impor

tant advance over our former technic in that it gives a satisfactory cure of the ventral hernia, a more comfortable pubic area, a possible restoration of sexual function and an improved cosmetic

44 ureterosigmoidostomies justify their continuation
We present a better method of closing the defect in the abdominal wall in both sexes and also

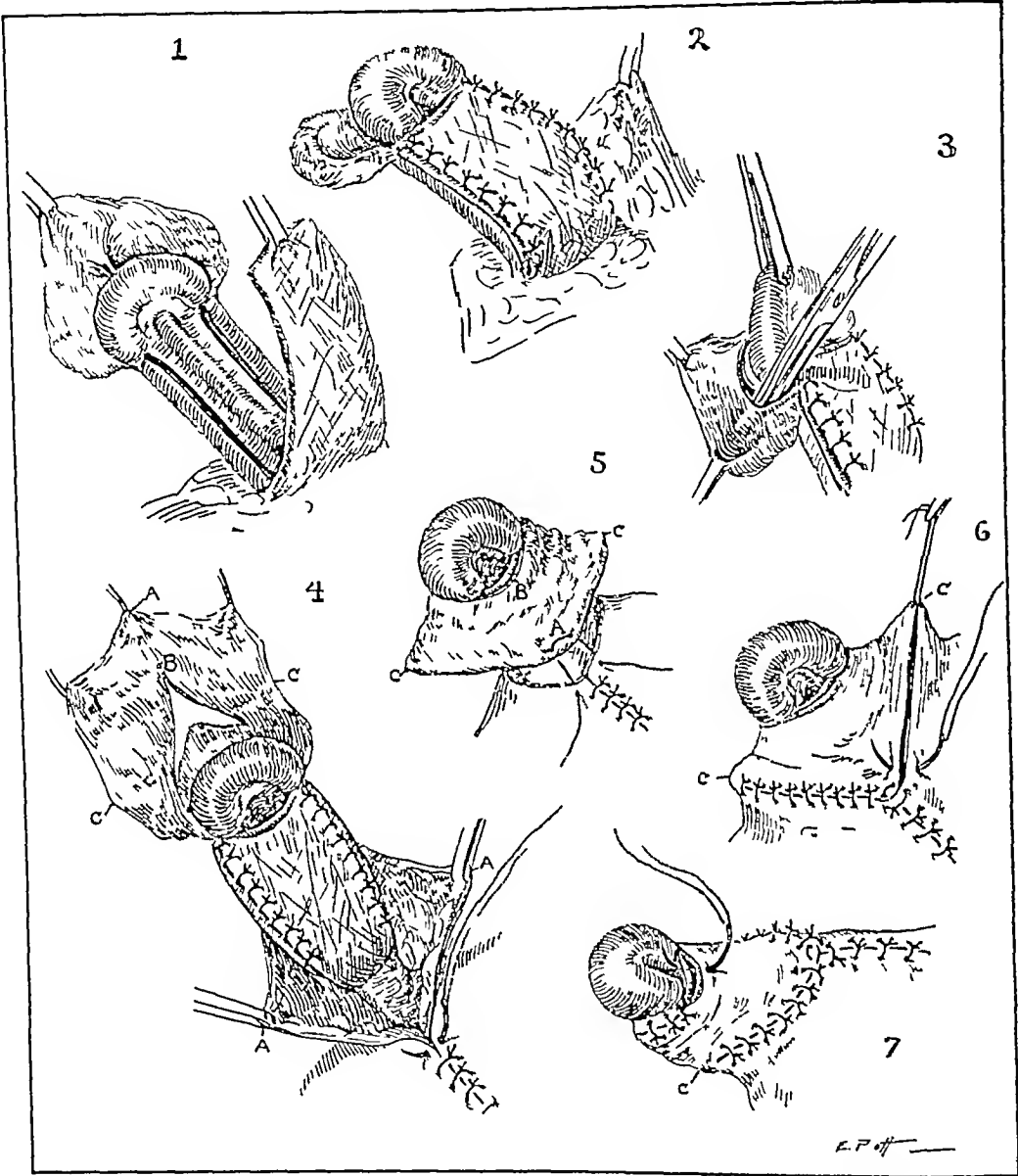


FIGURE 5
Shows the various steps in forming a new urethra

appearance with a lessening of the bad psychological effects of the malformation

SUMMARY

Seven additional cases of exstrophy of the bladder are presented. The methods previously advocated for the transplantation of the ureters have proved their worth, and the functional results in

a method of correcting the epispadias. We believe that these methods are improvements in the treatment of this distressing congenital anomaly.
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TUBERCULOSIS OF THE PANCREAS

Report of a Case

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TUBERCULOSIS of the pancreas is an exceedingly rare condition, hence the following case report should prove to be of interest

CASE REPORT

A white Portuguese woman, 60 years of age, entered the Rhode Island State Sanatorium with the chief complaint of cough and expectoration of 5 months duration. The family history and previous medical history were irrelevant. The patient stated that about 4 years prior to admission she began to have frequent headaches pain in the left arm and epigastric distress. She soon began to lose weight, became easily fatigued and complained of general malaise. It was known that the patient had had diabetes mellitus for an indefinite time, and she was first given insulin about 1 year previous to admission. Five months previous to admission she began to have severe cough and expectoration, dyspnea, night sweats and pain in the left chest anteriorly. An x-ray film of the chest was taken and the patient sent to the sanatorium with a diagnosis of far-advanced pulmonary tuberculosis complicated by diabetes mellitus. During her stay her temperature was of the septic type, with daily afternoon elevations to 101 or 102 F with a maximum elevation to 104 F 2 days prior to death. Cough and expectoration were pronounced but the most marked clinical symptom was constant, severe epigastric pain.

The diabetes was exceedingly difficult to control. On admission the blood sugar was 222 mg per 100 cc. and the urine contained 1.25 per cent sugar. Under insulin therapy over a period of 3 weeks the urine finally became sugar-free except for an occasional slight trace. The blood sugar promptly dropped to 60 mg per 100 cc. The insulin dosage was then decreased slightly the diet remaining the same, and it was thought that the diabetes was controlled as the urine contained at most a very slight trace of sugar. However within a few days large amounts of sugar appeared in the urine and the blood sugar was found to be 434 mg. per 100 cc. Thereafter almost daily changes in insulin dosage were required to maintain the urine sugar-free and the blood sugar near normal limits.

The patient's course was steadily downhill. The sputum was constantly positive for tubercle bacilli. Ascites developed and required paracentesis, 1800 cc. of slightly opaque, serous fluid being removed. This fluid was found to contain a few pus cells, a few large mononuclear cells but no tubercle bacilli or other organisms. The patient died approximately 15 weeks after admission.

Autopsy Caseous and proliferative tuberculosis with bilateral cavitation was found in the lungs, there being involvement of all lobes. No tuberculous involvement of any other organ except the pancreas was noted. The pathologist's description of the pancreas before removal from the abdominal cavity was as follows:

In the region of the duodenum there is massive fibrosis tying down the lower border of the stomach,

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the pancreas duodenum and upper portion of the omentum as a mass, with stellate radiation of scar tissue centering at the duodenal curvature. Dissection of the above area discloses the head of the pancreas reduced to a mass of apparently normal pancreatic tissue about 5 cm. in greatest width and 3 cm. in thickness. The remainder of the pancreas is for the most part replaced by firm fibrous tissue containing at the splenic end a smooth walled cyst 2 cm. in diameter filled with creamy purulent fluid in which can be demonstrated acid-fast organisms by direct smear. The pancreatic duct is patent. The bile duct is not involved. The pancreatolienal nodes appear as a chain of fairly firm, normal appearing lymphoid nodules, the largest 9 mm. in the long axis.

The microscopic description of sections from the pancreas was as follows:

One section from the head of the pancreas shows extensive fibrosis of the interlobar septums and peripancreatic tissue, with the parenchyma reduced to isolated lobules and alveoli which however appear active and essentially normal. A section from the tail of the pancreas shows almost complete replacement by hyaline connective tissue in which are noted occasional identifiable islands of Langerhans and alveoli. One border of the section and a small cavity within the mass are lined with a caseous, necrotic layer beneath which appears an intense endothelial infiltration in epithelioid arrangement. Occasional microscopic tubercles contain typically tuberculous giant cells, and a direct smear from the contents of the cavity shows numerous acid-fast bacilli.

The diagnosis was tuberculosis of the pancreas, with abscess formation.

That tuberculosis of the pancreas is of rare occurrence is attested by the fact that only three articles on this subject could be found in the American literature, the most recent¹ of these being published in 1924. A few more articles were found in the foreign literature, but here too the subject has been given little attention and very few cases have been reported.

The incidence of tuberculous infection of the pancreas as determined by autopsy reports of various authors is uniformly low. Scattered military tubercles of the gland are not uncommon in association with generalized military tuberculosis, but large tuberculous lesions of the pancreas are exceedingly rare. Textbooks of medicine and pathology give practically no information on the subject, merely stating that tuberculosis of the pancreas is of rare occurrence. White² in 142 autopsies on tuberculous subjects, including military cases, found the pancreas involved in only 1

case In 683 autopsies on tuberculous subjects in the Veterans' Administration hospitals no tuberculous involvement of the pancreas was found.³ Here at Wallum Lake tuberculous infection of the pancreas was found in 1 of 10 cases of military tuberculosis. The present case is the only one in which a large tuberculous lesion of the pancreas was found, and the only case not of the military type having involvement of the gland.

That the pancreas possesses a relative immunity to tuberculosis has long been recognized. The gland was cited as an illustration of local immunity to tuberculosis as early as the middle of the eighteenth century. This fact is important in view of the location of the pancreas in the abdomen. The gland is situated in an area richly supplied with lymphatic ducts and there are always lymph nodes in the vicinity, all intercommunicating with the lymphatic vessels of the spleen, duodenum and mesentery. Tuberculous involvement of the lymph nodes around the pancreas is not uncommon, and has been erroneously reported as tuberculosis of the pancreas. The pancreas communicates directly with the intestinal tract by the pancreatic duct, affording connection with an area very frequently bearing tubercle bacilli, as evidenced by the high incidence of intestinal tuberculosis. Military tuberculosis of the pancreas is undoubtedly of hematogenous origin. Carnot⁴ found tuberculosis of the splenic end of the pancreas in contact with a tuberculous kidney. Thus there are four avenues of infection by the lymphatics, by the pancreatic duct, by the blood stream and by direct extension from neighboring organs.

Why the pancreas should exhibit a marked degree of immunity to the tubercle bacillus has been the source of much experimentation and of many theories. Carnot⁴ demonstrated the extreme difficulty of reproducing clear-cut tuberculous lesions in the pancreas. Other investigators have published similar results, all indicating that no matter what the source of inoculation, true tubercles almost never occur in the pancreas. Carnot showed that tubercle bacilli rapidly lose their virulence following experimental infection of the pancreas, so that inoculation of a guinea pig with material from the gland one week after infection produces only a localized tubercle, with no extension at the end of a month and a half. With a longer interval before inoculating the guinea pig from the infected gland it was found that the virulence of the bacilli had diminished to such an extent that they rapidly disappeared from the tissues.

Interesting experiments were performed by

Porter⁵ in 1917 in an attempt to explain the relative resistance of various tissues to the tubercle bacillus. Attributing the highly resistant qualities of the tubercle bacillus to its fatty envelope, Porter reasoned that if this envelope could be first dealt with the bacillus itself might prove vulnerable to the protective mechanism of the tissues. The lipase content of extracts of various tissues was determined. Then the bactericidal action of these extracts on several strains of tubercle bacilli was tested. The least powerful was lung extract, which contained the smallest amount of lipase, the most powerful was pancreatic extract, which contained the greatest lipase content. Porter therefore suggested that the bactericidal action was chiefly the result of the lipolytic activity of the tissue on the bacilli. This experimental work was generally accepted by most investigators, and has been quoted in most textbooks on tuberculosis.

In June, 1938, Hirschberg and Arnold⁶ reported results of experiments performed by them in order to determine the nature of the relative immunity to tuberculosis exhibited by certain tissues. The effect on cultures of tubercle bacilli of tissue juices having no lipolytic activity was tested. The degree of inhibition exerted by the various tissue juices had a direct relation to the resistance of the organs to tuberculosis, as evidenced by the incidence of infection of these organs. Pancreatin, pancreatic digest and insulin were also tested, and were found to have no effect on the tubercle bacillus. It was concluded that the nature of the inhibitory element is not known and may be considered, at least for the moment, to be nonspecific.

The case reported herein is unique in that it is characterized by a disturbance of the function of the pancreas. In 1899 Loheac⁷ wrote a thesis on tuberculosis of the pancreas in which he described detailed symptomatology. He is the only author who has recognized and reported symptoms of pancreatic insufficiency resulting from tuberculous disease of the gland. Joslin⁸ states that a small remnant of healthy pancreas will suffice to prevent diabetes, and extirpation experiments on animals have proved that diabetes will be averted if one tenth of the gland is left. Hence, the number of islands of Langerhans remaining determines the efficiency of the gland. In the case reported here the pathologist noted almost complete replacement of the tail of the pancreas by hyaline connective tissue and the large tuberculous abscess. Since the islands are normally twice as frequent in the tail as in the head, it is logical to assume that the tuberculous lesion of the pancreas was instrumental in producing the diabetes mellitus.

As spontaneous drainage from the tuberculous abscess in such a location would necessarily be by way of the pancreatic duct and would be slow and difficult, one may further assume that drainage was intermittent, with consequent variations in the size of the abscess depending on the amount of purulent material retained. It is possible that this intermittent drainage may have played a part in the marked fluctuation of the diabetic state.

The diagnosis of tuberculosis of the pancreas can, of course, be made with certainty only at the autopsy table. However, its occurrence should be borne in mind and occasionally the diagnosis may be made with a fair degree of certainty in the living patient. The one clinical symptom common to all reported cases of tuberculosis of the pancreas is persistent and distressing epigastric pain. We know that the most prominent symptom of acute pancreatitis is excruciating epigastric pain. Therefore, persistent and constant epigastric pain in a tuberculous patient should strongly suggest tuberculosis of the pancreas. If diabetes is also present the diagnosis is more probable.

That diabetes mellitus unfavorably influences the prognosis of pulmonary tuberculosis has long

been recognized, and it is not within the scope of this paper to discuss this subject.

SUMMARY

A case of tuberculosis of the pancreas is reported.

The presence of this rare condition is suggested by persistent epigastric pain in a tuberculous diabetic patient.

The exact nature of the immunity to infection by the tubercle bacillus exhibited by the pancreas has not as yet been determined, and its discovery may offer a means of producing a general immunity to the tubercle bacillus.

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PENTOTHAL THE ANESTHETIC AGENT OF CHOICE FOR THE REDUCTION OF SIMPLE FRACTURES

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IN RECENT years many publications have discussed the use of Pentothal, but no paper has yet appeared which considers the use of the drug for the reduction of simple fractures in ambulatory patients. During the last two years I have had the opportunity to administer and direct the use of Pentothal in the Out Patient Fracture Service of the Boston City Hospital and the advantages it possesses where hospitalization is not necessary or desired have made it the anesthetic agent of choice.

The ideal anesthetic agent for use in the reduction of simple fractures in ambulatory patients should fulfill the following requirements: it should provide sufficient muscular relaxation for proper manipulation and reduction, it should be of sufficient duration for manipulation and application of maintenance apparatus, it should possess a short induction and short emergence time, it should be easily administered without expensive

or elaborate equipment, it should have a wide margin of safety, it should present no contra indications, and there should be specific therapy for its administration in excess.

In the following discussion the average patient coming to the outpatient clinic or office will be considered. In such cases hospitalization is not desired. Various anesthetic agents are available, and these will be considered in order to determine which most closely approaches the ideal as described above.

ANESTHETIC AGENTS

Local Anesthesia

Local anesthesia for the reduction of simple fractures of small bones is possible, desirable and often employed. However, in dealing with large bones and with fractures requiring a considerable degree of manipulation, sufficient muscular relaxation and anesthesia are often very difficult if not

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impossible to obtain. The induction time is often long, but the emergence time is short. This type of anesthesia is well suited for certain ambulatory cases. It has a wide margin of safety, and the only contraindications are hypersensitivity or local damage. A maximum of skill and experience are required in order to secure even fair results with local infiltration. Reactions and overdosage are combated by artificial respiration and respiratory and cardiac stimulants.

Nitrous Oxide

Nitrous oxide is a widely used and much abused anesthetic. It is the weakest gaseous anesthetic and is employed with varying concentrations of oxygen. Without medication it will in a majority of cases produce sufficient relaxation for reduction only if pushed to clinical or subclinical cyanosis. This anoxemia continued for a sufficient length of time for reduction and maintenance may produce damage to the brain that is definitely more serious than the original injury. There is marked excitement during induction and actual bodily restraint is often necessary. Furthermore, the following accidents and complications during induction must be considered: violent respiratory spasm with alarming degrees of cyanosis, vomiting with the inhalation of vomitus, sudden death due to ventricular fibrillation, and further physical trauma.

The duration of anesthesia may be insufficient, particularly if the reduction slips during the application of plaster or traction apparatus. The emergence time is short. This agent can be administered without expensive or elaborate equipment, nevertheless it requires at least a double yoke with oxygen and nitrous oxide tanks and a breathing bag and mask. The margin of safety with regard to the anesthetic concentration and the toxic or fatal concentration is not very wide. Nitrous oxide is contraindicated in associated head injuries, severe anemias or reductions in vital capacity, cardiac decompensation and hypertension. Premedication requires additional time and does not eliminate all the dangers or contraindications. The usual procedure in the use of nitrous oxide with the inexperienced and even sometimes the experienced anesthetist is to produce cyanosis and cerebral anoxia and then proceed with a struggling, excited, gasping, cyanotic individual until the desired result is obtained. The specific therapy for an excess of the agent is the inhalation of oxygen.

Ether

Ether will produce perfect relaxation for the time required to obtain and maintain reduction,

regardless of its length. It is easily administered even by the inexperienced, requires no elaborate equipment and has a wide margin of safety. The induction time is relatively long and spasm, coughing and vomiting are quite common. Vomiting is undoubtedly one of the most underestimated and overlooked dangers of anesthesia, especially during the administration of the inhalation agents. The average patient coming into the hospital or office for emergency treatment of a fracture has eaten within one to six hours previous to the time of fracture, and many are intoxicated. Inhalation of vomitus in these patients is fatal more often than is appreciated, and even when not fatal the morbidity is well worth careful consideration. With ether, emergence time is long and the patient usually requires some degree of hospitalization. It should not be used in the presence of x-ray or fluoroscopic equipment. It is contraindicated in diseases of the respiratory tract, kidney, liver and certain metabolic diseases. There are no specific therapeutic measures for overdosage. The usual resuscitative measures of oxygen therapy, artificial respiration, the intracardiac administration of adrenalin and respiratory stimulants are of some value.

Pentothal

A discussion of the intravenous barbiturate anesthetics should include a consideration of Evipal as well as of Pentothal, but owing to the almost exclusive use of the latter in this series of cases and because of the advantages it possesses, the former will be omitted.

Pentothal will produce sufficient relaxation for the reduction of any type of fracture, and by the fractional method of administration will maintain this relaxation for a sufficient length of time for the most difficult reduction and the application of any type of maintenance apparatus. The induction time is very short—one to three minutes—and is usually unaccompanied by excitement or struggling. The danger of the aspiration of vomitus is present with the intravenous anesthetics as well as with the inhalation agents, but the percentage of occurrence in the former is so small as compared with that of the latter agents that Pentothal holds a distinct advantage in this respect. In this series of administrations only 1 case of vomiting is recorded.

The emergence time is short and permits the patient to be accompanied home within thirty minutes to one hour. Pentothal is easily administered without elaborate or expensive equipment.

This method of producing anesthesia should not be employed by anyone who is not familiar with its use. Its margin of safety is to a great extent

dependent on the skill of the administrator. However, in the hands of one who has had sufficient experience to make him as competent with Pentothal as with the inhalation methods, the method is less hazardous than is the inhalation of ether or nitrous oxide, and produces better results than does local infiltration.

The contraindications are few, and are limited almost entirely to severe respiratory depressions and infections and extensive disease of the liver. Respiratory depression to a greater or lesser degree is always an accompaniment of barbiturate anesthesia, and it is to a large extent because of this that Pentothal is adjudged as dangerous by some competent anesthetists. The inexperience of the administrator is more evident in respect to the production of respiratory depression than in any other phase of Pentothal administration. In this series in only 1 case was respiratory depression severe enough to warrant oxygen therapy. However, on account of this ever present possibility extreme care must be exercised at all times to ensure thorough and complete oxygenation. The maintenance of a patent airway, and the administration of the oxygen if necessary, will reduce this complication to a minimum. For short procedures it is believed that damage to the liver is not of major importance if oxygenation is complete.

One of the additional advantages of this method is that there is no danger of fire or explosion if it is used in the presence of x ray or fluoroscopic equipment.

There is one indication for the use of Pentothal that is often overlooked. This occurs in fractures with an associated head injury. Most of these patients have multiple contusions and abrasions about the face with contaminated bleeding wounds, fractured skulls and evidence of damage to the brain. Nitrous oxide is definitely contraindicated. Ether will produce struggling, excitement, vomiting and increased intracranial pressure, with possible aggravation of the initial head injury. The mask or cone will have to be applied over a potentially septic and devitalized area. Pentothal is the agent of choice in these cases. The traumatized area is not touched, there is no struggling, intracranial pressure is not increased and the scalp and face wounds can be treated at the same time, or after the fracture has been reduced, without necessitating removal of the apparatus for induction. If severe respiratory depression from increased intracranial pressure exists, it may be unwise to use Pentothal, but still in many cases of this type it may be the least of the evils. These are not ambulatory cases, but they deserve some consideration in this discussion.

With all precautions taken in the use of the agents discussed there will still be an irreducible number of complications, but that this number will be lowest with the use of Pentothal has been our experience.*

TECHNIC OF ADMINISTRATION

In the use of Pentothal an adequate dose of atropine may be used as a premedicament. This can be administered intravenously if time does not permit the attainment of its effect subcutaneously. Atropine will minimize the bronchial constriction that may be produced by the anesthetic agent. Because of the danger of respiratory depression, some apparatus for the administration of oxygen with a breathing bag and mask and one of the analeptics should be available. No set dosage or scheme of administration can be prescribed, so that it is believed best to establish a standard method and to vary it according to the individual reaction. In the average adult, with the patient counting aloud, 3 cc. of a 5 per cent solution of Sodium Pentothal should be given in the first half minute, followed by a pause of thirty seconds to allow for circulation and maximum effect. Two cubic centimeters may be administered in the next half minute. By this time counting has stopped, the patient is usually asleep and respirations are slightly depressed. This is the point where it is necessary to be certain that the patient is well oxygenated. Reduction should not be undertaken until there is no reaction to pinching the skin and the respirations are regular and of good amplitude. Reduction with the patient in too light a plane of anesthesia may result in respiratory spasm and arrest. With the needle still in situ additional drug is administered in 1-cc. or 2-cc. fractions as required. From the above standard each patient will vary according to age and general physical condition. At present, Pentothal is not used in very young children.

RESULTS

During the first ten months of 1939, Pentothal was used for approximately 300 patients who were admitted, diagnosed, x-rayed, treated and sent home as ambulatory patients. These patients were anesthetized by members of the orthopedic and surgical services under the supervision and direction of the anesthesia service. There were no fatalities. As mentioned above, only 1 patient required oxygen therapy and an analeptic for respiratory depression and this patient had an uneventful recovery. Vomiting was present in only

Cyclopropane has been purposely omitted from this discussion because it requires elaborate and expensive equipment and a experienced administrator and is not available in the majority of outpatient clinics and offices.

1 case, and occurred during emergence with the patient in full possession of the cough reflex. No patient required hospitalization because of the anesthesia. Insufficient relaxation was never the cause of a poor orthopedic result. In a small proportion of cases readministration was necessary because of inadequate reduction, but in no case did a patient refuse to undergo a repetition of the anesthetic.

SUMMARY

The advantages and disadvantages of local, nitrous oxide, ether and intravenous barbiturate anesthesia for use in the reduction of fractures in

ambulatory patients have been discussed. The dangers of the inhalation of vomitus and of respiratory depression, the necessity of thorough oxygenation at all times and the need of an experienced administrator have been emphasized. Penothal seems to be the ideal anesthetic for this type of fracture because it produces sufficient muscular relaxation for reduction, can be continued as long as necessary, has short induction and emergence times, is easily administered and has an adequate margin of safety with few contraindications, while specific therapy for an excess of the agent is available.

THE TREATMENT OF ATROPHIC ARTHRITIS WITH ESTROGENIC SUBSTANCE*

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NOT uncommonly the menopausal and postmenopausal eras of a woman's life are associated with some degree of arthralgia. The condition may range from vague fleeting joint pains to a classic hypertrophic, atrophic or mixed arthritis. The hypertrophic and the mixed forms are in our experience by far the most frequent. Whether these changes are directly due to the endocrine readjustment of this period we do not know, but that they play some part in causation of the arthritides seems obvious.

Many authors (Mazer and Israel,¹ Scholler, Dohrn and Hohlweg,² Stone,³ Pratt and Thomas,⁴ Holmes,⁵ Champy,⁶ Kuipers,⁷ Recknagel,⁸ Cawadiaz,⁹ Kahimeter,¹⁰ Marchionini,¹¹ Fleischhaus¹² and Hall¹³) have reported encouraging results with the use of estrogenic substance in the treatment of hypertrophic joint disturbances occurring coincidentally with the menopause, either natural or induced.

We have also had similar experience in the treatment of such cases. After a careful analysis of results obtained we have concluded that although improvement was noted in the majority of our cases, it was of a general nature. Joint conditions per se, if secondary to hypertrophic changes, remained the same unless posture and weight were corrected.

A study of the climacteric symptoms, which were the general phenomena benefited by estrogen, with the exception of hot flashes, revealed a striking similarity to those experienced by the sufferer from atrophic arthritis. They were sweating, circulatory disturbances, mental depression, asthenia and paresthesias (numbness and tingling) of the extremities and nervousness.

Although the menopausal function is uncertain, it is generally conceded that with the cessation of ovarian function the anterior lobe of the pituitary gland becomes overactive, with a resultant influence on the endocrine tissues which come within its sphere. The objective signs of this period are supposedly the direct result of such action. The subjective phenomena mentioned are the well-known climacteric symptoms, and are probably due to a disturbance of the sympathetic nervous system. In discussing arthritis, Pemberton¹⁴ states that one can conceive of the sympathetic nervous system, and indeed the nervous system as a whole, as congenitally unstable.

This similarity of climacteric symptoms with those of sufferers from acute and chronic atrophic arthritis, together with reports that cases of atrophic arthritis were benefited by pregnancy,¹⁵ a period during which the estrogen level is high, led us to believe that estrogenic substance might have a place in the therapy of atrophic arthritis.

Twenty-three cases of arthritis, 17 being of the atrophic and 6 of the mixed (atrophic and hypertrophic) type, were treated with large doses of

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estrogen.* Twelve of the patients experienced a distinct improvement in joint symptoms while under this therapy, 5 of these had symptoms of active menopause, which were coincidentally relieved (Table 1). Three patients noted some improve

TABLE 1 Summary of Results

| TYPE OF ARTHRITIS | NO. OF CASES | CLINICAL RESULTS | | | |
|---------------------------|--------------|------------------|----------|-------------|------------|
| | | IM PROVED | BE LAYED | UNIM PROVED | MADE WORSE |
| Atrophic | 17 | 7 | 3 | 6 | 1 |
| Atrophic and hypertrophic | 6 | 5 | 0 | 1 | 0 |
| Totals | 23 | 12 | 3 | 7 | 1 |

ment and then relapsed. Seven patients noted no improvement, general or local, and 1 said she was worse. Eighteen patients were supposed to have passed a normal or a surgically induced menopause, but 6 of these still had active menopausal symptoms. Of the total of 11 patients with active menopausal symptoms, 7 noted improvement in the joint symptoms as well as in the subjective phenomena related to the menopause, while 4 noted a general improvement with no effect on the joint symptoms.

The duration of treatment ranged from one week to three months. The total dosage of estrogenic substance varied from 50,000 to 850,000 IU (international units). Individual doses ranged from 10,000 to 100,000 IU.

In the beginning the patient was given an intra muscular injection of 10,000 IU daily and when improvement was noted the interval was reduced to once weekly. If no improvement was noted the dose was increased gradually to 100,000 IU. After three or four such doses, if no change was noted, treatment was discontinued.

Twelve young sufferers from atrophic arthritis (moderately advanced) without menstrual disturbances were used as a control. Each was given 50,000 IU of estrogenic substance daily for one to three weeks. None showed any response.

Hall¹² has recently shown that following the castration of 71 women, 53 suffered from arthralgia rather than true arthritis, and that of 40 who were adequately treated with estrogenic substance 70 per cent responded to the extent of almost complete relief of menopausal and arthralgic symptoms.

It must be noted here that in some cases the giving of estrogenic substance had to be continued over a period of many months in order to maintain improvement, while in others improvement was noticed within a short time and continued even after treatment had been stopped.

Our criteria for the diagnosis of atrophic arthritis accorded with the classification set forth by the American branch of the *Ligue Internationale Contre le Rhumatisme*.¹⁶

The following cases are typical of those which showed improvement following estrogenic therapy.

CASE 1. K. M., a 49-year-old white woman presented herself at the clinic complaining of pain and stiffness in the neck, knees, elbows and feet. Onset had occurred 3 years previously with stiffness and numbness in the fingers, noticed chiefly on rising in the morning. Gradually the other joints became involved. Definite aggravation of symptoms was noted with changes in the weather.

The menstrual function ceased 4 years previous to admission following the removal of a pelvic tumor. The patient was still suffering from an occasional hot flash.

At physical examination the patient walked with slight difficulty. The elbows were partially flexed. The body weight was 138 pounds. The temperature, pulse and respirations were normal. The eyes, ears and nose were normal. The tonsils were diseased, the teeth and gums appeared to be normal. The neck showed 50 per cent limitation of motion in all directions. There was considerable tenderness on pressure over the cervical vertebrae. The shoulder motion was limited to 45° abduction in both. The elbows were flexed but could be extended to about 70°. There were swelling and tenderness in both wrists. The hands were somewhat swollen and slightly tender. The hands showed a tendency toward ulnar deviation with spindly shaped deformity in the middle and index fingers on the right, and in the middle and ring fingers on the left. The knees were swollen and tender to touch and motion. The suprapatellar bursae were thickened and distended with fluid. The cervix was negative. The diagnosis was atrophic arthritis of the cervical vertebral joints, knees, elbows and feet.

Estrogenic substance, 10,000 IU, was given daily from June 22 to July 6. At the end of this course of treatment the patient stated that the stiffness and pain in the joints were markedly diminished. Medication was withheld for 1 week, after which the patient reported back to the clinic complaining of a return of pain and stiffness in all the previously involved joints.

Estrogen substance, 10,000 IU, was given daily from July 20 to 26. Again improvement was noted. It was discontinued until August 12, and during this period the patient was decidedly worse. Ten thousand international units of estrogen was again given daily until August 17. At this time a tonsillectomy was done and the patient was not seen again until September 28 at which time she reported a return of symptoms in the knees.

CASE 2. E. E., a 43-year-old white woman complained of stiffness and pain in the arms, legs, knees and hips. One year previously she had started to have pain, swelling and redness involving both knees, with a gradual spread to the other joints. All the symptoms were worse in the morning and were definitely aggravated by changes in the weather. The menstrual function had ceased 2 years previously and since then the patient had had frequent hot flashes.

At physical examination the head and neck were normal except for diseased teeth and tonsils, and tenderness with slight limitation of motion in the cervical vertebrae. The heart, lungs and abdomen were normal. The extremities showed no contractures, but there were spindly shaped deformities of the fingers and swelling in the wrists.

*Estrogen, in the form of Progynon, was supplied through the courtesy of Schering Corporation, Bloomfield, New Jersey.

and knees. The gynecological examination was negative. The diagnosis was atrophic arthritis of the knees, hips, elbows and shoulders.

Ten thousand international units of estrogenic substance was given daily from May 4 to 17. At the end of the 1st week of treatment there was distinct improvement in the upper extremities, but the knees seemed to be worse. Some nausea was noted in the morning. The hot flashes and headaches were markedly improved. At the end of the 2nd week a marked improvement was noted in all the joints, the patient was again able to go up and down stairs, and slept far better than prior to the taking of estrogen. Estrogen was discontinued until May 25, at which time 10,000 IU was administered weekly for 4 successive weeks. At the end of this course the patient still complained of some pain and stiffness in the right hand. A tonsillectomy was done June 22. The patient was not seen again until July 20, at which time the joints were all improved. She stated, however, that her general well being was not so good as when she was receiving estrogen.

SUMMARY AND CONCLUSIONS

Our experience in treating hypertrophic arthritis coincident with the menopause by the administration of estrogen has led us to believe that the benefits, though striking, are of a general systemic nature. The joint condition per se must be treated by mechanical readjustment and weight reduction in order to bring relief.

The present study was made in an endeavor to determine whether estrogenic substance, which has such a marked effect on the subjective symptoms of the menopause, would in any way influence the strikingly similar symptoms of atrophic arthritis.

The rationale of this therapy was based on the assumption that both these symptom complexes probably result to some extent from a disturbance of the sympathetic nervous system.

The results suggest that little benefit is obtained in women suffering from atrophic arthritis who have no disturbance in menstrual function.

Atrophic arthritis occurring concomitantly with the menopause was benefited in a sufficient percentage of cases to suggest that this form of therapy has a definite place in the treatment of such cases of atrophic arthritis.

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REPORT ON MEDICAL PROGRESS

FUNDAMENTAL MISCONCEPTIONS INVOLVING
CLINICAL PATHOLOGY*

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BECAUSE clinical pathology is merely the adaptation of the fruits of fundamental research to concrete problems in medical practice, it is often difficult to define the precise limitations of the subject. In last year's report for this journal,¹ the subject matter was limited chiefly to practical procedures and precautions. The present report, on the contrary, will concern somewhat more fundamental aspects, which, although less practical, are probably more important. The scientific bases for many well known laboratory procedures are constantly changing, particularly as new methods enrich the basic sciences, and accordingly those interested in clinical pathology must continually adopt new methods and ideas.

PLASMA PROTEINS

One such revision of knowledge involves the plasma proteins. In the last few years, fundamental studies of the nature of these proteins have shown clearly that the usual clinical subdivision into albumin, globulin and fibrinogen is extremely gross. With the development by Tiselius² of an apparatus which permits accurate study of the migration of molecules in an electric field, it soon became obvious that the serum protein consisted of many more individual fractions than had been supposed. The classification of these is still tentative, but a brief synopsis of two hypothetical, isolated, characteristic plasmas (normal and nephrotic) is given in Table I.

This table is not intended to give possible variations or the range of normal values. Actually, the relative proportions of the various fractions are more constant in normal plasma than are the absolute levels. Further details may be found in the paper of Longworth, Shedlovsky and MacInnes.³

Although it has been suspected for a long time that there is more than one globulin in plasma, the albumin hitherto has been considered to be an entity. It is striking that recently even very pure, crystalline serum albumin has been resolved by this method into two components, as described by Luetscher.⁴

When albumin globulin ratios are determined by the usual salting-out procedures, the actual fractions involved are mixtures. The albumin fraction contains a moderate amount of globulin,

TABLE I Fractions of Plasma Protein

| FRACTION | OLD CLASSIFICATION | | NEW CLASSIFICATION | |
|-------------------|--------------------|------------------|--------------------|------------------|
| | NORMAL PLASMA | NEPHROTIC PLASMA | NORMAL PLASMA | NEPHROTIC PLASMA |
| | gm per 100 cc | gm per 100 cc | gm per 100 cc | gm per 100 cc |
| Albumin | 4.00 | 0.37 | — | — |
| Alpha | | | 0.70 | 0.11 |
| Beta | | | 1.30 | 0.76 |
| Globulin | 2.10 | 2.83 | | |
| Alpha | | | 0.46 | 1.47 |
| Beta ₁ | | | 0.31 | 0.16 |
| Beta ₂ | | | 0.53 | 0.92 |
| Gamma | | | 0.78 | 0.28 |
| Fibrinogen | 0.40 | 0.50 | 0.40 | 0.50 |
| Totals | 6.50 | 3.70 | 6.50 | 3.70 |

and the globulin fraction contains much albumin, as shown by Butler and his associates.^{5, 6} With the new apparatus of Tiselius⁷ it is possible to obtain a sort of spectrum, which pictures the distribution of various protein fractions in a given plasma, much as a photospectrograph analyzes the transmission of various wave lengths of light by a certain solution. The protein spectrum so obtained resembles a silhouette of a mountain range. The various peaks in the outline indicate various individual protein fractions. Moreover by measuring the area subtended by each peak, one learns the concentration of the fraction in question. Obviously, the area of the total silhouette represents the total protein concentration. The silhouette or spectrum diagram can be obtained readily by using an automatic camera as described by Longworth⁸ and by Philpot.⁹ The latter's method is the simpler and less expensive.

When this optical analysis is made of abnormal plasmas, interesting results are obtained, as described by MacInnes and Longworth¹⁰ and by Longworth, Shedlovsky and MacInnes.³ Moreover, the urinary protein can be subjected to similar studies, but, surprisingly enough is often normal in composition, no matter what the state of the plasma protein.

Detailed studies of abnormal plasmas have shown that characteristic changes occur in vari-

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ous clinical syndromes. In febrile conditions the alpha globulin tends to be increased. In the nephrotic syndrome, in myeloma and in obstructive jaundice, there may be increase in the beta globulin, which is associated with blood lipids. Immune bodies usually appear in the gamma fraction.

Luetscher¹¹ has summarized some of these changes as found in several well-known clinical syndromes. He has shown that when the colloid osmotic pressure drops because of loss of albumin, compensatory increases occur first in the beta globulin and later in the alpha globulin. The gamma globulin is low in the nephrotic syndrome but this is of little osmotic consequence as compared with the changes secondary to the severe loss in albumin. In terminal glomerulonephritis the plasma may approximate the normal. In a case of amyloid disease (with tuberculous lymphadenitis) the albumin was decreased and the gamma globulin increased. This same type of distortion was also found in cirrhosis of the liver, both in the plasma and in the ascitic fluid.

The apparatus involved is somewhat expensive and at present is available only for research purposes. Because the protein spectrums so obtained are highly characteristic, however, it seems very possible that eventually the method will be used routinely in clinical diagnosis and in order to follow clinical progress precisely. Meantime, it provides overwhelming evidence of the crudeness of the plasma-protein analyses now in common use.

PIGMENTS OF HEMATOGENOUS NATURE

Another revision is needed in the field of certain pigments related to, or derived from, hemoglobin.

"Porphyrinuria" For several decades, clinicians and pharmacologists have discussed the reddish color of urine which sometimes follows the taking of drugs or even may occur spontaneously. Recent work has focused attention on the excretion of porphyrins and other pigments in the urine of patients suffering from deficiency disease. For example, Spies and his associates¹² have described a red pigment, produced by the action of heat on ethereal extracts of urine from cases of pellagra. In this disease and in several other conditions, the pigment has been offered as evidence of porphyrinuria. Recently, however, Watson^{13, 14} obtained from cases of alcoholic pellagra a red pigment that had some of the characteristics of indirubin, a derivative of indol. Subsequently, he concluded that the pigment described by Spies, though differing from indirubin, was

nevertheless an indol derivative having the characteristics of urochrome.

Meiklejohn and Kark¹⁵ have confirmed these observations, working with urine from cases of endemic pellagra not associated with alcoholism. In these cases there was no abnormal excretion of true porphyrins. Such urines, however, may contain indican. Furthermore, they may show a characteristic urochrome reaction through the oxidation of ether-soluble indol derivatives in the presence of hydrochloric acid. It will be remembered that indol has long been recognized as a breakdown product of the amino acid tryptophane. When indolacetic acid is treated with nitrous acid, the solution turns a deep cherry red, and the pigment so formed has properties closely resembling the pigments now described by Spies¹² as "porphyrin-like substances."

These investigations, therefore, make it seem probable that marked pellagra may occur without porphyrinuria. The test used by Beckh, Ellinger and Spies¹⁶ to test urinary porphyrins has no direct connection with porphyrins, and these are better identified by some other procedure, for example, that of Brugsch and Keys.¹⁷

Cyanosis of Chemical Origin Last year I¹⁸ pointed out that the cyanosis induced by sulfanilamide presented a fundamental paradox. Briefly put, the difficulty was that the oxygen-combining capacity of the blood of very cyanotic patients is nearly normal, although the spectroscope shows the presence of methemoglobin and sometimes of sulfhemoglobin. In recent work, Webb and Kniazuk¹⁸ have made the following suggestions: the amount of methemoglobin or sulfhemoglobin present may or may not be enough to account for the cyanosis, and the cyanosis might conceivably be due largely to a colored oxidation product of the sulfanilamide. Such a colored product has not been identified precisely, although Marshall and Walz¹⁹ have suggested "aniline black," and Fox, Cline and Ottenberg²⁰ "a purple dye." Wendel and Wendel²¹ on the contrary, find that in some cases the amount of methemoglobin may be sufficient to explain the cyanosis, and that combinations of these pigments may occur. It seems more likely to Webb and Kniazuk that the contaminating pigments are not due directly to the interaction of sulfanilamide with natural substances in the body. They favor the explanation that a chaotic response by the hematopoietic system may yield abortive pigments related to hemoglobin. Indeed, Rimington and Hemmings²² found high values for ether-soluble "porphyrins" in the urine of patients treated with the drug.

Nevertheless, one cannot lightly dismiss the pos-

sibility of a dye that arises directly from the drug, because Barkan²⁷ has noted that under certain conditions blue sulfanilamide derivatives may appear which are readily reduced to the colorless state or re-oxidized to the colored form. Apparently nascent hydrogen peroxide is responsible for the formation of such blue oxidation products. The problem is complicated by the fact that, in the laboratory, blood samples from treated patients may continue to form methemoglobin after the blood is drawn, probably owing to the presence of a sulfanilamide derivative. Furthermore, solutions of sulfanilamide may turn black, especially if exposed to light. Thus various factors may combine to produce clinical cyanosis in a given patient.

With regard to sulfhemoglobin, it must be remembered that the widespread impression that this pigment contains sulfur has not yet been confirmed. It is clear that hydrogen sulfide—in the presence of oxygen—forms a green pigment from normal blood pigment *in vitro*, and it is therefore possible that the intestinal hydrogen sulfide produces sulfhemoglobin in the body. According to Barkan and Schales,²⁸ it also remains possible that this pigment belongs to the family of pseudohemoglobins, which normally accompany the hemoglobin within erythrocytes as intermediates between hemoglobin and bilirubin.²⁹ Like hemoglobin, the pseudohemoglobins contain unaltered globin, but the prosthetic group is an iron containing hemin derivative in which the porphyrin ring is open, and hence unlike hemoglobin. The pseudohemoglobins are the source of the "easily split off" iron of blood cells described by Barkan,²⁸ which, unlike hemoglobin, is ionized by weak acids. In the normal red cell, pseudohemoglobin combines reversibly with oxygen and carbon monoxide, as does hemoglobin, but the pseudohemoglobin has a higher affinity for carbon monoxide.

Due to the effect of carbon monoxide on the pseudohemoglobin, as Barkan and Berger²⁷ pointed out, cases of acute carbon monoxide poisoning show a remarkable decrease in the amount of "easily split off" iron in the blood even when so little carbon monoxide is present as to render spectroscopic examination or routine chemical tests worthless. Indeed, Schwarz and Deckert,³⁰ in a report on 80 cases of such poisoning noted that this change persisted for several days after the acute episode. Consequently, this test may prove to be important as a confirmatory diagnostic procedure, because blood is often drawn for laboratory analysis so late that the patient has already excreted most of the poisonous gas.³¹

HEMORRHAGE AND VITAMIN K

The prevention or control of hemorrhage, which complicates so many clinical conditions, has been modified considerably by the discovery of vitamin K. No longer, for example, does the busy intern routinely prepare jaundiced patients for operation by repeated injections of calcium salts, nor does he rely on the routine clotting time³² as a yardstick of operability in such cases.

The rapid accumulation of knowledge about vitamin K has led to the development of several methods for determining the concentration of prothrombin in the blood. For purposes of clinical investigation a rather complicated technique is required, as exemplified by the method of Warner, Brinkhous and Smith.³³ For a routine clinical laboratory the test worked out by Quick, Stanley Brown and Brinkhoff³⁴ is simple, and sufficiently reliable for ordinary clinical therapy. The test is read by noting the time at which a clot or definite threads of fibrin appear in transparent plasma. This plasma is first prepared from citrated blood, and the clotting mechanism initiated at a given instant by adding an excess of calcium and thromboplastin. The thromboplastin may also be freshly prepared from rabbit's brain by titration with acetone.³⁵

Less accurate, but very convenient, is the "bed side test" of Smith, Ziffren, Owen and Hoffman.³⁶ In this procedure a crude preparation of thromboplastin, extracted from rabbit or ox brain or lung, is used to indicate clotting in a small tube, which is tilted every few seconds. A normal blood is first tested, and the number of seconds (T_1) required for clotting is noted. The test is then performed in a second tube with the unknown blood (T_2). The "clotting activity" is calculated from the percental ratio of the two time intervals. In general hemorrhage will occur when the activity is only a third to a half of normal.

Because the prothrombin time is the net result of several factors, Warner³⁴ has pointed out that various methods may yield discrepant answers. Quick³⁴ also has emphasized the calcium factor in quantitative determination of prothrombin. The methods mentioned here, however, are serviceable in indicating the presence of a tendency to hemorrhage, and in cases of jaundice are definitely superior to the classic clotting-time methods, which may remain normal until hemorrhage is evident clinically. Even in babies from three to seven days old, the concentration of prothrombin may be estimated readily, as shown by Quick and Grossman.³⁷

Although jaundice is the chief indication for the employment of this test it is also of interest in other conditions which affect the accumulation of

vitamin K. Indeed, this "anti-hemorrhagic vitamin of the chick," first described by Dam and Schonheyder,^{37 38} is frequently lacking to a serious degree in patients suffering from a variety of disturbances. Among these are the chronic diarrheas similar to sprue, regional ileitis, hemorrhagic disease of the newborn and various diseases of the liver. In treating these conditions with natural vitamin (K₁ and K₂), with phthiocol or with synthetic substances like 2-methyl-1,4-naphthoquinone, it is desirable to control the effectiveness of therapy by laboratory observations because the response varies considerably from patient to patient. It also varies somewhat with the method of administration, as described by Butt, Snell and Osterberg³⁹ and, more recently, by Snell and Butt.⁴⁰

IODINE IN BLOOD

In thyroid disease and related endocrinological disturbances, there has long been confusion between the terms hyperthyroidism, thyrotoxicosis and Graves's disease. Because it has been impossible to measure directly increased thyroid hormone in the blood, many clinicians have used these words synonymously. During the past decade, however, micromethods have been developed for determining blood iodine which yield consistent results. Although the normal blood iodine concentration is probably less than 10 microgm per 100 cc (0.000,01 per cent), various investigators have attempted to divide even this small quantity into organic and inorganic fractions. The presumption is that the organic fraction reflects the concentration of circulating hormone. Long series of determinations by Gutzeit and Parade⁴¹ in Breslau, by Curtis and Puppel⁴² in Ohio and by Perkin and his collaborators^{43 44} in Boston all indicate that an approximate estimation of circulating hormone will be feasible in the near future.

Already there are strong indications that we must revise our way of thinking about Graves's disease by strictly separating clinical "toxicity" and chemical "hyperthyroidism" as two distinct variables which need not necessarily run parallel to each other. Both Curtis, Cole and Phillips⁴⁵ and Perkin and Hurxthal,⁴⁶ for example, have reported cases of Graves's disease in which nervous symptoms, eye signs, goitrous swelling and tachycardia (or auricular fibrillation) were severe, whereas the blood-iodine concentration was normal. In these patients, as might be expected, the basal metabolic rate tends to be relatively low. I⁴⁷ have recently pointed out that blood iodine may be fractionated into inorganic iodide, an or-

ganic iodine combination like thyroxine and an organic iodine combination like di-iodotyrosine. These three fractions occur in the thyroid gland itself, and much fundamental work remains to be done in correlating the three blood levels with the state of the gland.

At the moment, accurate blood-iodine determinations are available in only a few large clinics, but it seems clear that the information thus acquired is destined to be of considerable diagnostic help in those instances in which the basal metabolic rate is elevated for reasons which are primarily extrathyroidal. Neurovascular asthenia, cardiac decompensation, malignant disease and tuberculosis are among the conditions which frequently frustrate attempts at differential diagnosis.

The determination of total iodine may be inadequate because the ingestion of iodide may increase this blood level more than tenfold. In such cases, however, the organic fraction may even diminish. Consequently, the tendency is to study organic or hormonal iodine concentration.

It is not possible to give here detailed descriptions of the micromethods now available. Useful information has been obtained in this country by the procedures of Trevorrow,⁴⁸ of Perkin,⁴³ of Curtis and Puppel⁴² and of McClendon.⁴⁹ Full descriptions of methodology may be found in books by McClendon,⁴⁹ Elmer⁵⁰ and myself.⁵¹

BENZOL AND LEUKEMIA

Another misconception that has cost hematologists many hours and afforded law courts much grist for the oratorical mill is the differential diagnosis between benzol poisoning and aleukemic leukemia. It is now clear that the two conditions often merge, one into the other, and just as senile keratoses of the skin merge into epitheliomas, there is no sharp delineation between the two states. In a highly illuminating trilogy⁵² published recently and entitled "Chronic Exposure to Benzene (Benzol)," the clinical effects of benzol poisoning are discussed by Hunter and Gall and Brickley. These papers lead to the conclusion "The evidence that chronic exposure to benzene produces leukemia in human beings is still incomplete, but it is accumulating at a rate and to a volume which command serious consideration." The investigators cite cases in which patients previously exposed to benzol have been said to have had early myelogenous leukemia, low-grade chronic lymphatic leukemia or possibly early multiple myeloma. When the bone marrow of such patients was studied, it was found that,

contrary to classic opinion, hyperplastic marrow predominated over aplastic marrow. The degree of anaplasia and the number of mitotic figures strongly suggested malignant tissue. This type of bone marrow was closely similar to that described by Martland in cases of chronic radium poisoning, which also leads to prolonged stimulation of reproductive activity accompanied by arrest of maturation.

The case histories of these patients, supplemented by bone-marrow studies, are extremely interesting and serve to emphasize the increasing importance of bone marrow biopsy in the differential diagnosis in obscure cases. In particular these studies indicate forcibly that leukemia may be due to a tumor of the bone marrow in which benzol plays the role of a carcinogen. The obvious inference is that benzol is not the sole cause of leukemia, but that possibly other substances arising from physiological sources may lead similarly to leukemia.

One still hears discussions of blood findings which stress the occurrence of myelocytes in the blood as pathognomonic of leukemia. Indeed in a recent address to the American Society of Clinical Pathologists, the chairman⁶² said

Does anyone doubt that the presence of myelocytes and other immature cells of this series in predominant numbers establishes a positive diagnosis of myelogenous leukemia regardless of a clinician's opinion?

This statement is colored by an administrative problem concerning professional status which does not concern us here. Suffice it to suggest that hematological specialists constantly stress the fact that myelocytes may occur in considerable numbers in several conditions other than leukemia, for example in pneumonia. Furthermore in myeloid metaplasia the usual therapy for leukemia may prove fatal as pointed out by Jackson⁶⁴. In short, I believe that the diagnosis of leukemia should never be made without a comprehensive survey of all the clinical data available. In some cases, it may be necessary even to examine the bone marrow before the correct diagnosis is reached.

TYPES OF ELECTROPHOTOMETER

A common misunderstanding encountered in electrophotometry at present involves the respective optical arrangements of the single-cell and double-cell instruments. Last year I¹ called attention to the development of electrophotometers for clinical use and described the general method for the single-cell type. Since that time a number of technical details have been investigated further and consequently somewhat higher precision and reliability are now possible. Some of these prob-

lems have been described by Summerson⁶⁵. He believes that for very careful work it is desirable to use a nul point instrument in which two photoelectric cells are employed. Thus one can measure in rapid succession the color effect of the unknown and the standard, respectively. With this arrangement the depth of solution may be varied, and very high accuracy attained, as shown by Goudsmit⁶⁶. Furthermore, the relation between the scale reading and the concentration is independent of the depth of color in the system, so that the experimental accuracy is limited chiefly by the sensitivity of the photoelectric cell. The measurements are, however, independent of the actual value of the photoelectric-cell current, and measure the difference in voltage between a working and a reference cell. Indeed, the photoelectric properties of the reference cell are not used.

The use of the so-called calibration curve is eliminated, and indeed is not advised. For very accurate work, an unknown (X) may be compared directly with a standard (S), in much the same fashion as in visual colorimetry, by comparing the two readings (Rx and Rs). Since $SX = Rs Rx$, it follows that the unknown concentration

$$X = \frac{R_x S}{R_s}$$

On the other hand, the two-cell instrument may be used for many purposes with constant depth of solution. Under this condition, the concentration is read on a logarithmic scale which is often directly proportional to the concentration, so that direct readings can be made when the scale is properly numbered. Interchangeable standardized test tubes are used to hold the unknown solution or standard, the latter is made up simultaneously with the unknown.

Because such readings are not influenced by fluctuations in the light source, there is no need for storage batteries or constant-current regulators. The current can be adjusted adequately by means of a simple potentiometer, controlled through a low sensitivity galvanometer. This is true because the reference cell and the working cell react in the same way to minor fluctuations in power supply. In addition, the two-cell type measures the ratio between intensity in the same manner as the Dobosq visual colorimeter, which has greater accuracy than is obtained by using the difference between intensities, as is done in the one-cell type. In routine chemical readings only a single adjustment is required for each reading and for many substances the concentration may be read directly on the logarithmic scale.

A selective light filter which has a spectral width

of 50 to 75 millimicrons is used to screen out all light except that of the wave band to be measured. Such filters are available for most of the common colorimetric procedures.

The experience of the past year in various clinical and research laboratories has amply confirmed previous enthusiasm for a method which measures color in a tube merely on the insertion of such an interchangeable test tube into the instrument. The chief uncertainty at the moment is which type of instrument to choose.

SUMMARY

In conclusion, then, it is evident that in applying the methods of laboratory medicine to individual bedside problems, the oversimplified tests in common use may yield misinformation unless interpreted in the light of basic facts. Furthermore, because no basic fact can be trusted as being completely true, it is clear that constant vigilance must be the price of reliance on laboratory methods and their interpretation. This article has reviewed a few of the more recent revisions in medical tests and theories which have been necessitated by revisions of fundamental science.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD G. CABOT

TRACY B MALLORY, M.D., *Editor*

CASE 26041

PRESENTATION OF CASE

A fifty five year-old unmarried woman was admitted to the hospital complaining of indigestion.

The patient stated that she had always experienced occasional attacks of "indigestion" until fifteen years before admission when, following a large meal of steak and onions, she suddenly developed a severe attack of right upper abdominal distress with the vomiting of yellow gall. Following this attack of a few hours duration she was well until eight years before admission when she entered this hospital because of menorrhagia. She was given a sterilizing dose of x rays to the ovaries, and had one period a month following this treatment but no vaginal bleeding since that time. She was well until three years before entry when she again began having attacks of indigestion three to four hours after eating rich foods, particularly fatty foods. These attacks occurred every six weeks, were characterized by a preliminary bloated feeling causing her to loosen her corset, then a dull intermittent pain in the right upper quadrant of the abdomen, which was not crampy but made her quite restless. This dull ache always started in the right upper quadrant, sometimes went through to the right side of the back, and on one occasion three weeks before admission radiated to an area between the shoulder blades. The pain usually lasted about thirty minutes and was relieved by vomiting. Following this she noted a residual soreness in the right upper quadrant for twenty four or forty-eight hours. About six weeks before entry the patient noted the onset of periumbilical "soreness" and a feeling of gaseous distention and rumbling. There were no real abdominal cramps and no particular change in bowel habits except slight constipation. Three weeks before admission, following one of these attacks, the urine was dark, the stools were light colored, and she became slightly jaundiced. At no time did she experience chills and fever. She was examined in the Out Patient Department no masses were palpated. A Graham test showed a gall bladder which filled but contained many stones. An appointment was given for admission to the hospital. Since that time the

patient had noted a separate midabdominal steady soreness, which was aggravated when lying down. She had lost 10 or 12 pounds in the six week period before entry. She had experienced no tarry or bloody stools and no genitourinary symptoms during the present illness.

The physical examination revealed a well developed, moderately obese woman in no apparent distress. The examination was negative except for the presence of a firm, non-tender, grapefruit sized mass located in the left side of the abdomen. The mass could be moved quite freely from low in the left lower quadrant to a point opposite the umbilicus. The liver edge descended two fingerbreadths below the costal margin on deep inspiration. Pelvic examination was negative.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. The blood showed a red-cell count of 4,420,000 with a hemoglobin of 60 per cent (Tallqvist), and a white-cell count of 7100. One stool examination gave a ++++ guaiac test. The serum van den Bergh test was normal, indirect, and the non protein nitrogen 23 mg per 100 cc. A blood Hinton test was negative.

A gastrointestinal series showed moderate delay of the passage of barium through the small intestine. All films, taken hourly, showed a loop of small intestine in the left midabdomen, which did not change during the two-hour examination. The loop was wide, irregular in outline, retained barium and coincided with the palpable mass which lay over the wing of the left ilium. A barium enema was negative. A chest plate was negative.

On the ninth day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. HORATIO ROGERS May we see the x ray films?

DR. FELIX FLEISCHNER The Graham test shows the gall bladder filled with dye and small stones. The chest is negative. The examination of the gastrointestinal tract shows a loop of small intestine moderately dilated, and several films taken at hourly intervals show the same loop unchanged. Even when the loop was empty one can see an air bubble which corresponds in size and shape to the barium filled loop on the previous films. This loop coincides with the palpable mass. The examination of the colon is negative except for a shallow indentation in the descending portion. There is moderate delay of the passage of barium through the small intestine.

DR ROGERS Could you say anything from these films about the mucosa of that loop

DR FLEISCHNER There is complete destruction of the mucosa in the stiffened loop in the center of the palpable mass. There are some more loops probably fixed to the surface of the mass without appreciable destructive lesions.

DR ROGERS The first part of the history is consistent with gall-bladder disease. The subsequent course and the x-ray films show that there were gall stones in the gall bladder. Six weeks before admission a new set of symptoms began, which apparently increased until admission. Presumably six weeks before admission examination showed no mass, but on entry there was a very definite mass. The symptoms which she developed in the periumbilical region were related to the mass by x-ray study, and there is no reason to suppose that the mass was not the cause of the symptoms. These later symptoms are characteristic of small-intestine disease. Therefore, we must choose between one diagnosis to explain two quite distinct types of symptoms, or more than one diagnosis to account for both.

If we must make one diagnosis and connect the gall-bladder disease, which we know she had, and the small-intestine disease, which we also know she had, it seems hard to think of anything but a gallstone ileus. There are a good many factors here that help, perhaps to build up a misleading picture of gallstone ileus. The fact that the obstruction was never complete and progressive is characteristic of gallstone ileus, because a stone which is not big enough to obturate the intestine may be compressed by spasm, thus causing intermittent obstruction. A ++++ guaiac test on one occasion is consistent with mucosal erosion from any cause. The general good condition of the patient is more consistent with something which is of rather recent onset than with a chronic disorder. The fact that the gallstone does not show in the x-ray films is not conclusive. Dr Franklin G. Balch, Jr, found that in half the cases in our series which were x-rayed the stone did not show. The age group is characteristic of gallstone ileus. But the x-ray picture is very disturbing if we try to make that diagnosis. There appears to be a firm mass, and destruction of a rather large area of mucous membrane, which is not at all characteristic of recent gallstone ileus.

If we have to make two diagnoses, gall stones will be one in any case, and to that we must add some form of tumor or some form of infection or something quite different. If we consider inflammatory disease plus gall-bladder disease, we are confronted with a normal white count, a normal chart and symptoms not suggestive of inflammatory disease.

The inflammatory diseases we might consider would be regional ileitis or possibly x-ray enteritis from the previous x-ray treatment, which I do not believe was sufficient to produce this picture after eight years. We do not know how near this lesion was to the cecum, but the story is not that of regional ileitis. By its duration it should have been in the acute phase, and yet the patient had no elevated white count or fever.

The tumors that we should have to consider would be benign tumor of the intestine, possibly with intussusception, of which there is no evidence by x-ray, and malignant tumor. Carcinoma is rare as a primary lesion of the small intestine. It could be metastatic, but in that case there would probably be abdominal carcinomatosis, and this woman had not been sick long enough with intestinal symptoms to make one think that she could have had partial obstruction of the small bowel by carcinomatosis and nothing more to show for it than we have here. The pelvic examination and the barium enema you will remember were negative.

Another malignant tumor of the small intestine is lymphoma. I cannot rule out lymphoma. The sudden appearance of the mass would be against it. If we have to alter something to make this diagnosis fit, I should be inclined to change that observation in the Out Patient Department that "there was no mass." The patient was moderately obese, and perhaps the mass really was there. The laboratory data are consistent with lymphoma. The x-ray picture is very suggestive of it. So that I think the diagnosis lies between gallstone ileus with a degree of damage to a loop of small bowel which I cannot explain, and primary lymphoma of the small intestine, plus unrelated gall bladder disease. I submit these two diagnoses in that order, remembering that, statistically at least, a single diagnosis is more likely to be right than a multiple one.

DR FLEISCHNER I think the x-ray findings of an infiltrating lesion in a loop of the lower jejunum or upper ileum rule out gallstone ileus.

DR AUBREY O. HAMPTON Besides that the gall bladder filled with dye and the stones are too small.

DR ROGERS That is not an entirely valid objection because I have seen a gallstone taken out of the ileum which had focal concretions that increased it to the size of a golf ball, yet when the mass was cut the stone itself was rather small.

DR ARTHUR W. ALLEN Dr Rogers is perfectly correct in thinking that this mass was probably present at the time the patient was in the Out Patient Department, because, in seeing this woman,

the mass was much more easily palpable at some times than at others. We must remember that she came to the hospital with a typical attack of gallstone colic, and naturally, attention was directed toward the region of the gall bladder. At operation we found at least three coils of jejunum and a segment of descending colon all matted together. One would like to arrange a multiple stage resection for this amount of disease in the intestine if possible, but we could not orient ourselves clearly enough to warrant doing any kind of short-circuiting procedure as a preliminary operation. It was necessary to follow the jejunum down from the ligament of Treitz, and free the first loop from the main mass. There was an interim of normal bowel for approximately 60 cm., and then we came to the main tumor. It was also necessary to free the colon from the tumor before we could be sure that the mesentery of the affected small bowel could be safely removed. The upper loop of jejunum we believed was involved by contiguity, as was the descending loop of colon. The mesentery of the jejunum in the region of the tumor was tremendously thickened. It was the thickest mesentery I believe I have ever seen. It seemed to be very edematous. It was found that by resecting a segment of jejunum about 90 cm. long we could extirpate, in one piece, the segment containing the main tumor and that portion of jejunum which we believed was involved by contiguity. Then continuity was established by aseptic end-to-end suture. The involved colon was transected between clamps placed through a stab wound in the left flank, and an obstructive colostomy done. The patient is having the spur of the colostomy crushed at the present time. She has made a very good recovery. I should have liked to look into the pelvis since she had been previously radiated for vaginal bleeding, but I did not believe we should explore the abdomen to that extent, nor did we do much about looking at the gall bladder or bile ducts. We found no evidence in the abdomen of extension of this disease beyond the area I have described.

CLINICAL DIAGNOSIS

Tumor of small intestine (? lymphoma)

DR. ROGERS'S DIAGNOSES

Gallstone ileus?

Lymphoma of intestine, plus unrelated gall bladder disease?

ANATOMICAL DIAGNOSIS

Malignant lymphoma (stem-cell type) of jejunum

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. The various specimens that we received showed an extensive area of neoplastic involvement of the small bowel, which was thickened and dilated and had the appearance often described as 'rubber hose.' There was extension of the tumor into the mesentery, and enlargement of a number of nodes deep in the mesenteric root. The tumor had obviously invaded the serosa of the large bowel and another loop of jejunum. The gross appearance was very characteristic of lymphoma of the bowel and on microscopic examination we made that diagnosis. It was the least differentiated type of lymphoma, one which we have been recently calling the stem-cell type. There is no question that it was very rapidly growing although I do not believe it was quite as rapid as the history might indicate.

DR. EDWARD A. GALL. May I ask the roentgenologist how many intrinsic tumors of the bowel produce localized dilatation in the area of involvement?

DR. JAMES R. LINGLEY. Twenty five per cent of tumors of the bowel produce dilatation rather than obstruction. I do not know of anything else that will dilate a localized loop like that.

DR. MALLORY. You do not see it with inflammatory lesions?

DR. LINGLEY. Not so far as I know.

DR. MALLORY. This patient is now being referred to the Tumor Clinic, and I presume is going to have postoperative radiation.

DR. J. H. MEANS. Do you suppose there was lymphomatous involvement of the liver? It came down two fingerbreadths. Is that common with gall-bladder disease or stone?

DR. MALLORY. Normal livers not infrequently come down two fingerbreadths.

DR. ALLEN. At operation we looked at it particularly, and it appeared to be normal.

DR. MALLORY. Involvement of the bowel occurs not infrequently in the course of general lymphoma, but I think more often lymphoma of the bowel is a sharply localized disease, we have reason to believe it was in this case.

DR. MEANS. It may be followed by general lymphoma later?

DR. MALLORY. Yes. You may confidently expect such an event if there is no treatment, and usually in spite of treatment, although we have had a number of very long cures following surgical removal of lymphomas of the gastrointestinal tract.

DR. ALLEN. We took out all the mesentery of the involved bowel. We believed we could do this with safety, but we were cutting through edematous tissue. Is the mesentery involved in

the process or was the edema due to lack of lymph drainage to the area?

DR. MALLORY There was considerable extension of the tumor into the mesentery, but I do not believe that all the swelling represented tumor. As you said, it was edematous.

DR. MEANS I should like to check on the physical examination. Do you state definitely that you have seen a good many cases in which the liver edge was definitely felt two fingerbreadths below the costal margin and in which the liver was perfectly normal at necropsy?

DR. MALLORY Yes

CASE 26042

PRESENTATION OF CASE

A fifty-year-old woman was admitted to the hospital complaining of pain in the abdomen, back and legs.

Two years before admission the patient successfully underwent a Miles operation for carcinoma of the rectum, performed in an outside hospital. Following this procedure she was well, with a normally functioning colostomy opening, until six months before entry, when she began having difficulty in regulating the discharge from the colostomy opening. She also began experiencing "various pains" in the abdomen, back and legs, which were not explained organically, and showed "extensive ecchymosis" with a positive tourniquet test. The bleeding and clotting times and complete laboratory studies were allegedly normal. Roentgenograms of the pelvis and lumbar spine and a gastrointestinal series were negative. She was treated on the basis of having had an anxiety neurosis with a strong cancer phobia, and was placed for a while in a psychiatric institution. Therapeutic adjuvants were sedatives, analgesics and, occasionally, codeine. Trascentin was given for the relief of intestinal spasm, and Theelin injections, with the thought that her symptoms were aggravated by the menopause. She showed some improvement in her outlook and ability to control her symptoms while in the hospital. Her condition remained approximately the same following discharge until six weeks before admission, when she consulted another physician and complained of numbness of the feet and legs, — saying they felt as though they were blocks of wood, — of mental depression with fits of crying and of pain in the lower back. She was wakeful, noisy and even hysterical. Examination failed to show any evidence of metastases, and there were no neurological signs in her extremities. The colostomy opening appeared satisfactory and functioned well,

although she complained of abdominal distress. These symptoms continued. Beginning nine days before entry, tarry, and on one occasion bloody, stools were noticed. X-ray films of the lumbar spine and pelvis were again negative. She was then given 0.5 cc of snake venom for its psychological effect and with the thought that it might relieve her pain if there was any. She was given 1 cc on each of the following days, during which time she developed purpuric spots on the arms and chest. A blood examination four days before admission showed a red-cell count of 2,300,000 and a white-cell count of 7100, the smear was not remarkable. The next day the red-cell count was 1,700,000, the hemoglobin 30 per cent, the bleeding time 3.5 minutes, and the clot retraction normal. The urine examination was negative. She received two 500-cc transfusions of citrated blood, and the red-cell count rose to 2,800,000 one day before admission.

Physical examination revealed a fairly well developed, disoriented, pale woman, who was somewhat unco-operative and negativistic. The heart was slightly enlarged to the left, and there was a blowing systolic murmur heard to the left of the sternum. The blood pressure was 195 systolic, 100 diastolic. The lungs were essentially negative. Palpation of the abdomen was unsatisfactory. The patient was incontinent of urine during the examination. She complained of such intense pain in the left leg that she would barely let the examiner touch it. She could raise it, although it seemed to be more flaccid than the right. The biceps, triceps and radial reflexes were exaggerated and equal. The right patellar response was exaggerated and greater than the left, which seemed slightly less active than normal. Visualization of the bowel, through the colostomy opening, with a proctoscope was unsatisfactory, the instrument could be passed only for a distance of 8 to 10 cm. A bimanual examination, with a right hand finger in the colostomy opening and the left hand in the vagina, revealed no masses suggestive of tumor, although there was a smooth, hard, fixed area behind the cervix which did not feel cancerous.

The temperature was 98°F, the pulse 80, and the respirations 20.

Studies of the blood revealed a red-cell count of 3,200,000 with 78 gm of hemoglobin (photoelectric-cell technic), a white-cell count of 10,700 with 86 per cent polymorphonuclears, and an otherwise negative smear. The urine was negative except for a ++ albumin test. The blood ascorbic acid was 0.9 mg per 100 cc, and the blood Hinton test was negative. Roentgenograms of the colon were unsatisfactory because the tube could not be introduced far enough into the colostomy opening.

ing. It passed directly downward for a distance of 20 cm where it met obstruction, apparently a kink in the bowel as it turned upward, as fast as barium was introduced it returned through the stoma. One short length of bowel, apparently sigmoid, was demonstrated. Portal films of the skull showed no evidence of metastatic cancer, the pineal gland was calcified and in normal position.

The patient's condition became steadily worse, both psychically and physically. She died on the eleventh hospital day.

DIFFERENTIAL DIAGNOSIS

DR. WYMAN RICHARDSON: When I first glanced at this case I decided it was very obscure. After looking more carefully I decided it was very simple. If it is simple, I may be right. If it is obscure, I shall have to get someone to make the diagnosis for me.

First, I want to take up the question of whether in the beginning this patient had a blood dyscrasia. Since thinking about it, I have been wondering what dyscrasia meant. I looked it up yesterday and the definition I saw was a morbid condition due to a toxic agent in the blood, which is not the ordinary connotation of the word, but may in fact, in this case, be a fairly good definition. In regard to ecchymoses, purpura and bleeding tendency, did she have some type of purpura? She certainly did not have thrombopenic purpura because of normal bleeding time, normal clot retraction and normal smear, if we can assume that there were platelets in the smear. She could not have had scurvy—I think there is nothing suggestive in the history, and the blood ascorbic acid was high enough to rule out symptoms due to scurvy. That leaves us with a toxic purpura. It might have been due to drugs. The purpura might be due to snake venom. I know that there are snake poisons that are hemolytic whether some might produce purpura, I do not know.

In regard to some primary blood disease involving the red cells, she did have an anemia which, from the levels of hemoglobin that we are given was essentially normochromic. There was no evidence of severe hypochromia, on that basis I think we can rule out chronic blood loss. If the anemia was entirely due to blood loss it must have been a very severe hemorrhage in order to reduce the red-cell count to 1,500,000 or a little over. If it was severe hemorrhage, one would expect a reduction in the blood pressure to shock levels, but the blood pressure was 195 systolic, 100 diastolic. Loss of blood might be a factor in the anemia

but it does not seem to fit the blood picture as a whole. There is nothing else in the record to suggest a primary anemia. We have to leave it out. Is there anything to suggest a leukemic process or any other primary blood disease? I do not see it.

Now I should like to go back and read the first two sentences of the history. "A fifty-year-old woman was admitted to the hospital complaining of pain in the abdomen, back and legs. Two years before admission the patient successfully underwent a Miles operation for carcinoma of the rectum, performed in an outside hospital." My plan is to forget the rest of the record and assume that the patient had a recurrent carcinoma of the pelvis with pressure on the lumbosacral nerves and that she did have serious pain. I think it is perhaps fortunate, at least if I am right, that I was not able to see the patient. Hind sight is better than foresight, and without seeing the patient it is flying in the face of Providence to say that the patient did not have recurrent disease in the pelvis. That is what I am going to say. If so, why did she become disoriented and go downhill so rapidly? She did not die of hemorrhage, because the red count tended to come up if anything. What did she die of? Cerebral metastases? Certainly this is not the death of cerebral metastatic disease. It is well known that a tumor in the pelvis may interfere with certain functions, and particularly with the function of renal excretion, and it seems quite possible that this recurrent tumor interfered with the function of the bladder. We know that she was incontinent. Was she incontinent because she had a big dilated bladder, with stasis, and did she have a marked uremia from that? It is rather difficult to say that in this case in view of all the examinations that were done. One would think a pelvic examination, particularly, would have revealed a large distended bladder, but nevertheless I suggest that as a possibility.

The other possibility it seems to me is that the patient had obstruction to the ureters and, with that, a uremia. In any case I am quite confident that the patient did have uremia and that that explains why there was a marked hypertension on the first examination in the face of very severe anemia. That also might explain the anemia itself or part of it. Frequently with severe uremia there is a normocytic, normochromic anemia, sometimes macrocytic. There is one other statement in the examination. A "bimanual examination revealed no masses suggestive of tumor although there was a smooth hard fixed area behind the cervix which did not feel cancerous." I do not know but I suppose postoperative scar

tissue may feel hard To my point of view it might well have meant cancer

They did not determine the prothrombin level Might liver disease explain the bleeding tendency? That is going too far afield There is no evidence of metastases in the liver, and I think it is foolish to bring that in at all

I am going to say that the patient had recurrent carcinoma in the pelvis I am not quite sure why the bleeding from the gastrointestinal tract was so marked, but it is known that if one has uremia, one may get bleeding from the gastrointestinal tract, with or without ulcers One cannot say much more about it than that I am going to predict that she had recurrent carcinoma in the pelvis with uremia due to obstruction to urinary outflow, either because of bladder dysfunction or ureteral obstruction That is what I call the simple answer

DR. TRACY B MALLORY Do you care to voice an opinion as to whether she had schizophrenia? I cannot prove the point

DR. RICHARDSON I should hate to give that opinion without at least talking to the patient

CLINICAL DIAGNOSIS

Recurrent carcinoma of rectum?

DR RICHARDSON'S DIAGNOSES

Recurrent carcinoma in pelvis

Uremia due to bladder dysfunction or ureteral obstruction

ANATOMICAL DIAGNOSES

Carcinoma of sigmoid, with extension to pelvic tissues and obstruction of ureters

Hydroureter, bilateral

Hydronephrosis, bilateral

Hypoplasia of bone marrow

Bronchopneumonia

Arteriosclerosis, aortic, coronary and cerebral, slight

Infarction, left optic thalamus

Operative scar resection of rectum and colostomy

PATHOLOGICAL DISCUSSION

DR. MALLORY The postmortem examination did show carcinoma which massively involved the pelvis It may or may not have been recurrent. Our feeling was that it probably was not but was a cancer in a new area of bowel In the sigmoid, about 10 cm from the colostomy opening, was a tumor which involved all layers of the intestinal wall and which had all the appearances of a primary carcinoma This was unquestionably the source of the continued intestinal bleeding It was in direct contact with a mass of tumor which completely encircled the pelvis and unquestionably involved all the nerves that passed through the pelvis and also both ureters Above the point of obstruction the latter were markedly dilated, and there was bilateral hydronephrosis. So far as the anatomical evidence can be offered for uremia I believe she had it I am not entirely certain about the cause of the anemia Certainly the renal insufficiency was a possible factor On the other hand, the bone marrow was quite markedly hypoplastic, more so than I can remember having seen in ordinary renal insufficiency, so that I am tempted to believe that some other toxic agent may have caused the hypoplasia of the bone marrow The brain was negative except for moderate arteriosclerosis of the vessels at the base and a small area of softening in the left optic thalamus

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REPORTS ON MEDICAL PROGRESS

THE new series of progress reports has already entered into its second year, and the *Journal* takes this opportunity of expressing its appreciation to the fifty odd contributors who have made and continue to make this feature possible. Various letters to the editor and numerous requests for reprints, received from all parts of the country by the authors, attest to the popularity of these reviews, and the editorial staff is firmly convinced that this method of commenting on current medical trends should be continued. In the scheme for the current year, new topics will replace those of last year in which advance has been, of necessity, relatively slow, and large topics, such as cardiovascular disease and arthritis, will be covered from a somewhat different point of view. The effort to make the reports of value to the prac-

ticing physician has apparently been successful, but the *Journal* welcomes suggestions in regard to titles and to the method used in presenting the material.

For those physicians who wish to obtain the reports in bound form, arrangements for reprinting were made with Little, Brown and Company, of Boston, and the book, *Reports on Medical Progress—1939* has already been offered for sale at a reasonable figure. As a year book the volume is unique for it covers progress in all branches of the medical profession in a way that should appeal not only to the physician in general practice but to the specialist who wishes to keep in touch with fields of medicine other than his own.

SOCIAL HYGIENE DAY

FEBRUARY first has been designated as Social Hygiene Day. Throughout the country there will be meetings, radio talks and demonstrations to inform the public as to the work which the national and state societies are doing.

What, exactly, is "social hygiene," and in what activities are the societies that bear its name engaged? Hygiene, according to Webster, is the science of the preservation of health, the limiting adjective, "social," may be interpreted broadly as the relation between men and women. Social hygiene, therefore, may be defined as the science of preserving a healthy attitude toward the sexual aspects of life. Although it has to do essentially with the sexual relations of mankind, it is not limited to a consideration of the procreative act alone. Its purpose is the development of a sound attitude toward all the problems connected with sexual life.

The activities of the societies for social hygiene branch out in various directions. One important function is the prevention of gonorrheal diseases through the education of youth. The actual treatment of these infections is left very properly in the hands of physicians, clinics and the state boards of health. Another function is the establishment of personal counseling services to which individuals who are unhappy because of sexual maladjustment can apply for help. The prob-

lems encountered are those that trouble many unmarried people, as well as those of maladjustment in marriage, which if unchecked lead to the divorce court. Many of the latter are not primarily related to sexual matters alone, but have to do with economic causes, uncongenial employment and other stresses that crack the solidity of married life. Other activities of social-hygiene agencies vary from studies of the care of syphilitic mothers to the closing of unsavory places of entertainment.

The measures employed for these purposes are largely of the educational type. The distribution of literature, such as the pamphlet, *Growing Up in the World Today*, and various others on syphilis and gonorrhea, is supplemented by the lending of books from a carefully chosen library. Lectures are given on syphilis and gonorrhea, on boy and girl interrelations, on preparation for marriage and on marriage adjustment. Some five hundred of these lectures are given annually by the Massachusetts Society for Social Hygiene, the audiences consist of clubs of boys or girls, students in high schools, normal schools and colleges, church groups, parent-teacher associations and women's clubs. During the past year, the Massachusetts society, in conjunction with the Committee on State and National Legislation of the Massachusetts Medical Society, sponsored a bill which required premarital examination for the detection of communicable diseases, including syphilis.

The Massachusetts Society for Social Hygiene is affiliated with the American Social Hygiene Association and in turn has affiliations with several local social-hygiene committees—in Springfield, Holyoke, Pittsfield and Cambridge. For the work done in Greater Boston, the society receives support from the Community Federation, of which it is a member agency. From this fund and from other sources it derives the money with which to carry on a broad educational program. It is impossible to estimate the actual returns from the expenditure of this money, one can only point to the increased demand for lecturers and institutes and to the awakened interest shown by women's clubs and employers in the problems created by genitoinfectious diseases and in the measures that may be taken to lower their inci-

dence. Furthermore, the requests for advice from the personal counseling service are more than can be met.

There is a demand for services such as the social-hygiene societies are equipped to render. It is to be hoped that the desire for economy now spreading throughout the country will not result in a curtailment of their activities.

ADDITIONAL SERUMS FOR THE TREATMENT OF PNEUMOCOCCAL PNEUMONIA

THE facilities available to Massachusetts physicians for the treatment of pneumococcal pneumonias continue to increase. An announcement in this issue of the *Journal* states that, in addition to therapeutic serums for three additional types obtainable under the usual restrictions, those for all other types of pneumococci will be supplied by the Massachusetts Department of Public Health in those cases in which the organism is found in the blood, spinal fluid or peritoneal cavity.

Sulfapyridine alone is finding a place in the treatment of pneumococcal pneumonia, but in certain cases therapeutic failures will result if specific serum is not also used. Certainly, when the organism is found to be causing a bacteremia, meningitis or peritonitis, every useful method should be used to save the life of the patient, and it is gratifying to know that serums will be easily obtainable for such cases in the future.

MEDICAL EPONYM

ASCHOFF BODIES

These structures were first described by Ludwig Aschoff, then professor of pathology at Freiburg, in an article entitled "Zur Myocarditisfrage (The Problem of Myocarditis)" which may be found in the *Verhandlungen der deutschen pathologischen Gesellschaft* (8: 46-53, 1904). A section is translated as follows:

We succeeded in finding peculiar nodules which seemed to be specific for rheumatic myocarditis. These nodules were clearly marked, it is true, in only two cases of recurrent endocarditis, but corresponded in their location exactly to the cellular proliferation found in other cases. They usually lay in the neighborhood of small or medium sized blood vessels and often showed the most intimate relation to the adventitia of

these vessels, or there was found simultaneous involvement of all layers of the blood vessels such as has been described in arteritis nodosa. The nodules are extremely small, at most submillimetric in size, and arise through the collection of notably larger elements with one or more abnormally large slightly notched or polymorphic nuclei. The aggregation of cells often occurs in the form of a fan or rosette. The periphery is formed by the large nuclei; the center by the confluent protoplasm of the cells which often seems to stain weakly or otherwise appears to be a necrotic mass. The fan-shaped foci recall when superficially observed, the tiny necrotic areas of gout with the peripheral cell mantle as they are frequently found in gouty kidneys.

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SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

FATAL PUERPERAL SEPSIS FOLLOWING NORMAL DELIVERY

Mrs. M. A., a twenty-nine year-old primipara, was admitted to the hospital February 3, 1912, in active labor. The expected date of confinement was January 22, her last period having begun on April 15, 1911.

The patient's family and past histories were not recorded. There had been no complications during this pregnancy.

The physical examination on entry was normal. The lungs were clear and resonant, there were no rales. The heart was not enlarged, there were no murmurs. The pelvic measurements were normal. The baby was in an OLA position, and the head was engaged.

After ten hours of active labor the baby was delivered spontaneously. There were no lacerations. The mother's condition following delivery was good.

On the fourth postpartum day, she complained of a sore throat and had a chill, with an elevation of the temperature to 104.4°F. The abdomen was tender in both lower quadrants. The lochia was thick, dark, and foul smelling. The following day, February 8, there was marked tenderness and spasm in the lower abdomen. Moderate distention was relieved by enemas and flaxseed poultices. An intrauterine douche of sterile water was given, followed by one of alcohol. Morphine was used for pain. By February 12, nine days after delivery, the patient had developed a mass in the left lower abdominal quadrant. Vaginal examina-

tion disclosed a mass the size of a coconut, which was tender and non-fluctuant.

During the course of the next ten days the patient seemed to recover from the peritonitis but her temperature and pulse remained elevated. Her abdomen was flat, soft and non-tender. Vaginal examination revealed that the pelvic mass had involuted and was the size of a hen's egg. The right vault was free. The patient was given strychnine, digitalis and caffeine for stimulation. Brandy was administered freely.

The heart by February 27, twenty-four days post partum, was enlarged and evidently failing rapidly. The pulse was of poor quality. A diagnosis of myocarditis was made. Two days later she developed pulmonary edema and died. The diagnoses were streptococcal tonsillitis, parametritis and septicemia.

Comment. This case was another which occurred in 1912 during a hospital epidemic. It is interesting that the temperature did not rise until the fourth postpartum day. In such epidemics, infection may occur at any time during the hospital stay. A sterile douche was used with no more effect than we now know we should expect. In cases such as this one, in which the patient survives for as long as three weeks after the onset of the infection, recovery frequently occurs. In this case, not only did an apparent septicemia exist but also a parametric infection, as evidenced by the mass palpable in the left lower quadrant. Such masses should always be treated conservatively except those which develop into pelvic abscesses and hence require surgical drainage.

STATED MEETING OF THE COUNCIL

A STATED meeting of the Council will be held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, February 7, at 10.30 a.m.

BUSINESS

1. Call to order at 10.30 a.m.
2. Presentation of record of last meeting (published in *New England Journal of Medicine* 221:699-703 1939).
3. Report of auditing committee and of treasurer.
4. Reports of standing committees and special committees.
5. Appointment of delegates.
 - a. To the House of Delegates American Medical Association for two years from June 1, 1940.
 - b. To the annual meetings of the five New England state medical societies in 1940.
 - c. To the Annual Congress on Medical Education and Licensure, American Medical Association.
6. Incidental business.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

Councilors are asked to sign one of the two attendance books before the meeting. The Cotting Luncheon will be served immediately after the meeting.

ALEXANDER S. BEGG, *Secretary*

RESOLUTION BY THE MIDDLESEX EAST DISTRICT MEDICAL SOCIETY ON THE DEATH OF GEORGE NATHANIEL PLUMMER MEAD

George Nathaniel Plummer Mead, for forty-seven years an honored member of Middlesex East District Medical Society, died December 15, 1939. He was born in Concord, New Hampshire, February 18, 1859, and spent his boyhood there. He was graduated from Harvard College and Harvard Medical School, beginning the practice of medicine in Everett, Massachusetts. In 1896 he moved to Winchester, taking over the practice of Dr. Daniel March, and he remained a citizen of that town for the rest of his life.

Dr. Mead retired in 1929 after forty-one years of busy practice. He had the best interests of this society at heart and was always active in promoting medical progress. As the need for hospital facilities became more urgent he worked to establish in Winchester, first, a cottage hospital, which was opened in 1912, being sponsored by the Visiting Nurse Association, and, after that, the present modern, adequate institution. He was a good citizen, a loyal friend, a kind and generous man. His relations with his fellow practitioners were always guided by the highest medical ethics. He was respected and beloved by a large clientele. Therefore, be it

RESOLVED, That in the death of Dr. Mead this society record the passing of a loyal and honored member, a kind and generous friend.

MILTON J. QUINN,
RICHARD J. CLARK,
DANIEL C. DENNETT

DEATHS

LANE—WALTER A. LANE, M.D., of Milton, died January 21. He was in his sixty-eighth year.

Born in St. Louis, Missouri, he graduated from Hyde Park School in Chicago. He attended Dartmouth College and received his degree, cum laude, in 1899 from the Harvard Medical School. Dr. Lane served his internship in 1898 and 1899 at the Boston City Hospital and began practice in Milton in 1900. For a short time after receiving his degree he served as an assistant in chemistry at Harvard Medical School.

Dr. Lane was a fellow of the Massachusetts Medical Society and the American Medical Association, and was a member of the New England Pediatric Society. He served as vice president of the Massachusetts Medical So-

cety in 1932 and 1933, as chairman of the Committee on Public Relations from 1932 to 1937 and as a delegate to the House of Delegates of the American Medical Association in 1937. Dr. Lane had also served as president of the Norfolk District Medical Society and was a councilor from that district at the time of his death. He held memberships in various organizations, including the Dorchester Medical Club and the Boston Clinical Club.

Dr. Lane was a director and consultant of the Sharon Sanatorium and a member of the staffs of the New England Deaconess and Faulkner hospitals. From 1906 to 1924 he had served as Milton school physician.

His widow, a son and a daughter survive him.

McINTIRE—GEORGE F. McINTIRE, M.D., of West Barrington, Rhode Island, died January 9. He was in his seventieth year.

Born in Worcester, he received his degree from the Harvard Medical School in 1908. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

Dr. McIntire was a founder of the Cambridge City Hospital and had practiced surgery in Boston and Cambridge.

NYE—HARRY R. NYE, M.D., of Leominster, died January 8. He was in his sixty-ninth year.

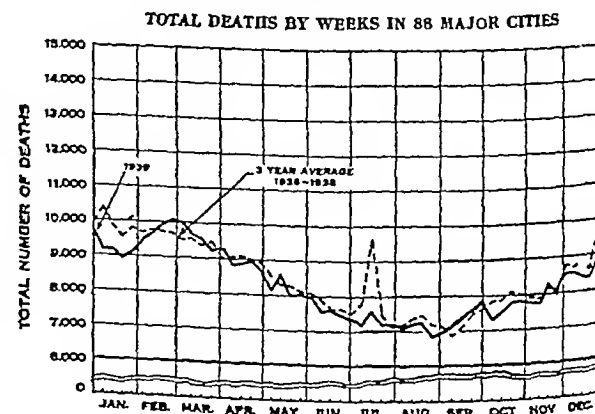
Born in Clarendon, Vermont, he received his degree from the University of Vermont College of Medicine in 1900. He served his internship at the Mary Fletcher Hospital in Burlington, Vermont, and had practiced in Leominster since 1907. Dr. Nye was a member of the staff of the Leominster Hospital for twenty-seven years.

He was a fellow of the Massachusetts Medical Society, having served as a councilor and also as past president of the Worcester North District Medical Society. He was also a fellow of the American Medical Association.

MISCELLANY

ANNUAL MORTALITY SUMMARY FOR 1939

Deaths in eighty-eight major cities during 1939 were 1 per cent over the 1938 figures, according to preliminary reports recently made public by Director William L. Austin, Bureau of the Census, Department of Commerce. The



infant death rate in these cities was slightly lower last year, compared with 1938.

Deaths in the eighty-eight cities totaled 429,419, compared with 424,348 reported for 1938. The weekly death totals reported in 1939 were consistently lower than the average totals for the preceding three years from January to July, inclusive. During the rest of the year, however,

they were closely similar to the averages of the preceding three years. The more favorable mortality record is due, probably to the smaller number of deaths from influenza and pneumonia during the winter and to the less extreme heat conditions during the summer.

The 25,713 infant deaths reported for 1939 represent a decrease of 1446 or 5.3 per cent, from the 27,159 reported for 1938. On the basis of estimated number of births there were, in 1939 41 infant deaths for each 1000 births. Although this figure is provisional it indicates a slight decrease in infant mortality when compared with the comparable provisional rate of 43 for 1938.

In the comparison of infant rates for different cities certain considerations must not be overlooked. The effect of differences in sex, age and racial composition of different cities must be evaluated before valid comparisons can be made. — *Bureau of the Census*

NOTE

At a recent meeting of the Harvard Chapter of Alpha Omega Alpha the following men from the fourth-year class of the Harvard Medical School were elected to membership: William Bacon, Addison G. Brenizer Jr., Thornton Brown, Bernard D. Davis, Francis T. Gephart, Bernard German, Charles H. Herndon, William F. Hickey, Edward Melman, Ernest Millard, Gordon S. Myers, Edward L. Pratt, Charles W. Sorenson and Thomas H. Weller.

CORRESPONDENCE

TREATMENT OF PNEUMOCOCCAL PNEUMONIA

To the Editor The Massachusetts Department of Public Health is making some changes in its program for the treatment of pneumonia and is providing under certain restrictions, serums of additional types. The new program includes:

1. The provision as in previous years of concentrated therapeutic (horse) serums for Types 1, 2, 5, 7 and 8 obtainable for the treatment of patients with infections due to one of these types, as determined by an approved typing laboratory.
2. The provision of concentrated therapeutic (rabbit) serums for Types 4, 9, 14 and 18 on the same basis as indicated above.
3. The provision of concentrated therapeutic (rabbit) serums for all other types for patients with *bacteremia meningitis* or *peritonitis* due to one of these types, the determination of which has been made by an approved typing laboratory.
4. A new circular describing the use of sulfapyridine; this drug appears to be valuable in the treatment of pneumococcal pneumonias.
5. A revision of the serum circular which is distributed with all specific horse serums provided by the department.
6. Revised case-report forms supplied by the department, which must be completed and returned to the department for all serum-treated cases.
7. New receipt forms, which must be signed by the physician receiving the serum and by the issuing agency.

The distribution of therapeutic horse serums will be continued as in previous years through typing labora-

tories. Therapeutic rabbit serums for Types 4, 9, 14 and 18 will be available only through the five typing laboratories from which Type 14 was supplied last season. All other therapeutic rabbit serums will be available from only two points: the Bacteriological Laboratory at the State House, Boston, and the Westfield State Sanatorium, Westfield.

The rabbit serums are being purchased, and the amount of money available for this purpose may not suffice for all demands. Therefore the continuation of this service will depend greatly on the conservation of funds effected through the prompt return of any unused serum.

Copies of the new sulfapyridine circular and the revised serum circular are being mailed to all physicians in the State and are also available at the approved typing laboratories. Additional copies of these circulars and a list of the laboratories at which the various serums may be obtained will be furnished by the department on request.

PAUL J. JAKMAUHI, MD
Commissioner of Public Health

State House
Boston.

HEALTH SERVICE, INCORPORATED

To the Editor It appears that a group of members of the Massachusetts Medical Society proposes to engage a charitable (?) corporation known as Health Service, Inc. incorporated organized for the purpose of selling medical and surgical services on a yearly basis to any and all who may qualify and are able to pay the annual charge. This is a mutual arrangement in that receipts are to be divided on a pro rata basis.

As with the Blue Cross organization, this service will doubtless soon be on the market, duly advertised through the newspapers and by agents who will solicit "business" throughout the community in stores, churches and factories and from door to door.

This movement should be seriously scrutinized for it promises to go far. It accepts all able-bodied individuals with incomes up to \$3500 per year but not those too poor to pay the fees, or those who fail to pass a physical test. These happily will still be taken care of by free clinics and general practitioners as usual.

This project should be scrutinized from three angles. The first concerns its relation to traditional standards of medical ethics as to advertising medical services and soliciting trade by ordinary business methods. It is obvious that if a group of five can do this, so can a group of three or two—or even one individual. Why may not I as a member of the Massachusetts Medical Society in good and regular standing engage a business agent to advertise and sell my services on a basis of annual fees in competition with the parent organization? I might strike legal difficulties to be sure, but that is not the question.

Secondly I may have to do something of the sort or give up the practice which I have acquired over a period of forty years, and which I see seriously jeopardized by a number of factors which hardly need to be mentioned.

Already under the Blue Cross, inroads are being made upon private practice, far more serious than has been generally recognized. The patient, I have frequently observed, having bought hospital insurance naturally picks out his hospital first and regretfully finds a doctor or surgeon assigned to him out of a staff from which his own doctor is excluded. The latter however is invited to call, and tries not to wince when the staff doctor takes all the fees. He is hopeful that his patient will come to

him later, but alas, the ethical (?) follow up letter, so popular now with most consultants, takes care of that. "In the interests of science," he is told, he should come in for a periodic checkup.

In the present state of competitive medicine one sometimes doubts certain philanthropic declarations. The general practitioner knows at least that his income has been derived largely from families in the lower income brackets—if \$3500 per year may be so termed. Apparently this entire class is to be taken right out from under his eyes—in the name of philanthropy—or else?

The question will be asked: Why not join the associates and get yours while the getting is good? And this, we must admit, smacks of worldly wisdom. Obviously, if others can do it, so can we—or I, and the course seems clear and inevitable—that is, if the Society and the State approve.

The third consideration (or perhaps this should be the first) is the welfare of the patient. This of course is put forward as the object and purpose of the whole business.

But *business* it appears to be, first, last and all the time. It cuts across and tends to jeopardize every legitimate private practice. It tends to a dictatorship in a close corporation organized upon a groundwork of rules and restrictions determined by the "higher ups." The average conscientious general practitioner, it seems to me, would feel himself often unpleasantly handicapped—let us say—by the three mile limit or being told just who and who not to use in consultation.

The very principle upon which good medical ethics has been based in the past seems to be at stake, namely, that the close friendly relation and personal responsibility between patient and physician should be guarded in every possible manner.

And so we hesitate. Is it because we are old fashioned and have a sort of lingering horror of introducing commercial methods into the practice of a profession to which one has given the better part of a lifetime? Do we see this kind of medical practice at the crossroads? Are we saying "goodbye forever" to that form of professional brotherhood which has characterized our cult from the days of Hippocrates? And are we entering now into a mad competitive struggle for the spoils of war—characteristic of a modern age which says—well—never mind what it says!

We well recognize that the whole problem revolves about the patient's best welfare. But this, I am sure, has always been the first consideration, with every general practitioner worthy of the name. Can we continue to trust that worthy instinct as we have done in the past and—will it be improved by regimentation?

WILLIAM W HARVEY, M.D

114 Fenway,
Boston

To the Editor As a practicing physician I am much interested in the letter with accompanying explanation of the health service plan, which appeared in the December 7 issue of the *Journal*. The letter suggests willingness to elucidate the plan further, if it is desired, and certainly more light is needed by some of us.

The scheme is described as a "budgeted health service plan," and in any such plan what one wants to know is how to pay the bill or how to budget whatever cost there may be. If I were a patient asking to know how to budget my already insufficient income, I should get very little assistance from the explanation in the *Journal*.

The analysis presented is so inadequate that one may

well question the soundness of the reasoning based thereon. The first sentence in the explanation begins "Because of the increasing cost of good medical care." The statement would be even more nearly true if it began

"Because of the increasing cost of government," or "Because of the increasing difficulty of keeping a job." Budgeting is important, but having an income to budget is more fundamental. What I mean is that much of the proposed action to enable people to pay for the cost of sickness is, although sometimes called too radical, as superficial as the polish on an automobile, when its efficacy in solving any real problem is considered.

Even if the statement began "Although the cost of medical care has been cut in half,"—which it has not been,—the conclusion of the statement—"many individuals today, who are self-supporting in the absence of sickness, are forced to become charity patients when confronted with serious illness"—would still be true. Also the explanation gives no actuarial basis for the scheme.

It is stated "Constructive criticism by the profession is eagerly desired." My only suggestion is that the proponents of the scheme state clearly in detail what it is they are going to do, and then we can all be in a better position to judge what they are likely to accomplish. Just now the statement fails to explain too much that needs expansion in order for a cautious person to have confidence in the practicability, much less in the substantial advantage, of the scheme.

STEPHEN RUSHMORE, M.D

520 Commonwealth Avenue,
Boston

To the Editor My attention has been called to Dr. David Sherwood's letter concerning Health Service, Incorporated, in the January 18 issue of the *Journal*. Dr. Sherwood thinks it is unfair for a lay organization such as Health Service to describe its service to the public in order that subscribing groups may be formed by those who wish to avail themselves of this service, and believes this situation deserves a protest.

The protest, I assume, is directed to Health Service, and I accordingly accept it. In so doing I wish to express the point of view of Health Service and, I believe, many of the lay public concerning certain questions which are of importance to the medical profession and which must necessarily be met in establishing a voluntary, self-supporting plan for budgeting the costs of medical care.

Payment of doctors' bills by families whose incomes are above the charity level often entails major financial difficulties. Many people in this income group delay in seeking medical care, curtail the amount of service sought or request charitable medicine from the profession or community. It is, therefore, to the interest of this portion of the public, to physicians and to the public which supports charitable medicine that the cost of distributing medical services be established in order to permit the provision of readily available and adequate medical care financed by those who receive it. If this is to be done on a voluntary basis, the consumers of the service must voluntarily form groups so as to provide an average cross section of health and illness. It is difficult to see how such groups can be formed, so that the medical service may be available to the public, without presenting to and discussing with the public the details of the service. If groups of the public want this service, it is to their interest to see that its availability is appreciated, for the suc-

cess of the service and therefore, the benefit to the public depend on the membership's being large enough to provide sound actuarial management.

To help clarify the question raised about solicitation attention may be called to the fact that Health Service, or the White Cross, was organized by lay representatives of the public in response to a demand voiced by numerous lay groups. After organization, Health Service sought appropriate arrangements with members of the medical profession for providing medical care to its subscribers. As has been commented on in the *Journal* the arrangement first contemplated was not approved by the Committee on Public Relations of the Massachusetts Medical Society and by other groups of physicians on the ground that it did not provide for adequate service. Accordingly, Health Service consulted a group of physicians concerning the manner in which adequate medical care could be provided to its subscribers. Finally, after this group had consulted with physicians engaged in various branches of medical practice, an agreement was entered into between Health Service, Incorporated and Medical and Surgical Associates for the provision of medical care to members of Health Service by duly licensed physicians. The major considerations determining the manner in which the medical care was to be provided and the details of the various agreements were presented to the medical profession in the December 7 and 21 issues of the *Journal*. The adequacy or quality of the medical care that should be available under these agreements has not I believe been questioned.

The question raised by Dr Sherwood was considered very carefully with the aid of legal and professional advice. Indeed, our appreciation of the importance of conforming to and protecting medical ethics was one of the major factors determining the final organization of Health Service, Incorporated. We believe that Health Service can describe the service which it makes available to the public and assist in the necessary organization of groups of subscribers in a spirit of rendering a non-profit public service without conflicting with or "undermining" medical ethics. We appreciate that the profession should be concerned lest desirable ethical principles be transgressed. At the same time, we would regret any unwarranted protest by the profession which might embarrass the ethical performance of a public service.

Other protests have reached us, which we believe also reflect a misunderstanding of our purpose. Some complaint has been made that the income limit of \$3500 per family is too high an income for eligibility to membership in this service. In considering this point it should be understood that this service is not intended for persons who fall into the class of those justly receiving charity medicine. It is interesting to remember that today in the City of Boston persons from families whose incomes are as high as \$50 a week or \$2500 a year are admitted to charity service. Since this is so a service for persons above the charity level should be permitted. There is, of course, the possibility that the distribution of costs under Health Service plan will permit persons now receiving charity medicine to become paying patients. But it is unreasonable to ask a financially self-supporting service to restrict its membership almost entirely to people who today when confronted with serious illness fall within the charity group. Different points of view should always be of interest because they are usually informative. It is, therefore, of interest that laymen are objecting to the arbitrary limit of \$3500 on the ground that their need of this service and their interest in its financial stability demand raising it to an appreciably higher figure.

The question of financial stability of such a service is of course a matter of no little concern to the profession for at least two reasons. First, unless such services are soundly financed, the remuneration of doctors is inadequate and the standards thus set may have a detrimental effect on professional remuneration in general. Second in so far as voluntary schemes fail financially the evidence supporting the need for governmental compulsory systems becomes more convincing to the public.

Those concerned with establishing this service have of course, been deeply concerned over assuring its financial soundness. This is an additional reason why the organization of the medical service is of prime importance. An effective administration unit is essential. The evidence that we have thus far been able to obtain clearly indicates that at the inception of the plan an unlimited choice of licensed physicians by subscribers is incompatible with solvency. The application of this latter principle would result almost certainly in such uneconomical functioning that a fair remuneration to the physicians rendering service to subscribers would be impossible. In so far as this might involve all physicians the interests of all physicians would be jeopardized. It is this aspect of the organization of such services either by the government or by medical societies that introduces a lack of economy and efficiency that renders such services radical ventures. We believe that such limitation in choice of physician as is contemplated in this service is in the interests of conservation of financial solvency and of the medical profession. If the White Cross plan succeeds and as the service grows, obviously a larger and larger percentage of the physicians in any community would be rendering service and receiving compensation under the plan and every effort will be made to give patients their choice of physicians and to give physicians the opportunity to accept as patients under this plan subscribers who have been their patients. If any body of physicians is inclined to disagree on this point, we should welcome their indicating wherein we are wrong and how the public can be given this service more conservatively. In this connection we have entertained the apprehensions expressed by Dr Fitz in his letter published in the January 11 issue of the *Journal* and we heartily approve his recommendation.

Finally those of us who are attempting to render a public service are concerned with the freedom permitted individual physicians in determining whether they wish or do not wish to co-operate in making available to the public such a voluntary plan of budgeting medical costs. As can be plainly seen, the freedom accorded physicians in this matter is not the concern only of a medical profession organized on and believing in democratic principles, but also of the public.

I trust that such differences in viewpoint and opinion may arise in the course of providing this service may be discussed fully and adequately by all whose interests are involved so that the action finally taken at each stage in our progress will help solve, not add to, the problems before us.

FRANCIS H. RUSSELL, *President*
Health Service Incorporated

18 Tremont Street,
Boston

REPORTS OF MEETINGS

GREATER BOSTON MEDICAL SOCIETY

At a regular meeting of the Greater Boston Medical Society at the Beth Israel Hospital on November 7, 1939 Dr Max Rutov introduced the speaker Dr Morris Fishl

bein, editor of the *Journal of the American Medical Association*. Dr Ritvo gave a brief biography of Dr Fishbein, from his birth in Missouri in 1889, through his education at Rush Medical School from 1910 to 1912, his position as assistant editor of the *Journal of the American Medical Association* from 1913 to 1924, and his tenure as editor from the latter date to the present. He also indicated the tremendous amount of work entailed in the life of a man who not only has positions on two medical school faculties, but also has published fifteen books and conducts a daily health column appearing in two hundred newspapers.

The title of the evening's talk was "The Medical Profession and the American Government." The speaker maintained that such a subject would not now be under discussion had either party concerned itself with the other in 1918. That was not the first agitation for so-called social medicine, however, for the House of Delegates of the American Medical Association had recommended as early as 1876 the carrying out of the proposal of Dr Bowditch, of Boston, for a national health council and national secretary of health. Dr Fishbein, in reminding his audience that such a plan had not as yet been realized, stated that such a condition would persist until the medical profession made an agitation such as that now being carried out by the government.

In 1913-14, the first modern enthusiasm for compulsory sickness insurance followed the enactment of such a law in Great Britain through the efforts of Lloyd George. Since that time a small group of people, who have since worked "persistently, relentlessly and ruthlessly," have tried to develop federal legislation for medical care. Their associations at that time were with philanthropic organizations, but they are now found on essentially all governmental welfare and health committees.

In 1932 the Committee on the Costs of Medical Care suggested a program which would find the entire medical profession reorganized around the hospitals, with employed doctors as specialists and the local physicians as "feeders." The patients were to be organized voluntarily, and there was to be a non medical administrative agency in each state to carry out the distribution of doctors, organization of patients and so forth. Dr Fishbein at that time condemned the proposal as revolutionary rather than evolutionary and compatible with socialism if not communism.

The proposed enactment of the Social Security Law in 1933 led to the appointment of a technical advisory committee for medicine, headed by the ubiquitous non medical economists aforementioned. The American Medical Association became aroused when compulsory sickness insurance was tentatively suggested. The subsequent conclave of the House of Delegates led to President Roosevelt's summoning twelve doctors, headed by the late Harvey Cushing, to a conference. Dr Fishbein was particularly hearty in his praise of Dr Cushing's endeavors, which so resulted that compulsory sickness insurance was deleted from the bill. There was, however, \$10,000,000 appropriated for use by the United States Public Health Service and the Department of Child and Maternal Welfare. Dr Fishbein stated that some states have an increasing residue of this jointly raised money because of the lack of adequately trained men and projects on which to spend this appropriation. A similar condition obtaining in the fields of genitoinfectious diseases, cancer and poliomyelitis led the speaker to suggest that, at present, money is far from the sole answer to existing medical ills.

As to the practicality of assessing each worker 4 per cent of his salary for sickness insurance, Dr Fishbein pointed out that an additional 300,000 government em-

ployees would be necessary to carry out the clerical work alone. And to show that the present Social Security system of collection and distribution is still experimental, it was stated that there are now 12,000,000 "John Doe" cards in Washington, that is, cards whose owners are unknown to the government.

More recently 4000 WPA workers were employed in a national health survey which resulted in the National Health Program. In order ostensibly to draw up the provisions of this program, the National Health Conference was called. Dr Fishbein stated that a reliable high official admitted after the meeting that the conference was "stacked against the medical profession." Eighty per cent of the delegates were known to be in favor while, Dr Fishbein claimed, fully 95 per cent of even the audience were selected for their known propensities. The speaker alleged that Mr Harry Hopkins had the complete program in hand eight months before the conference but that no physician saw its provisions before the second day of the conclave. Naturally, the program remained intact but without the necessary legislative backing as yet. In presenting the proposal to the Senate, President Roosevelt "wisely" suggested careful study of its provisions and refrained from recommending its enactment.

The prospective emergency led to another special meeting of the House of Delegates of the American Medical Association. This was dominated, according to Dr Fishbein, by a group of public-health officers who were desirous of procuring control of the care of the indigent and medically indigent.

Attempts by many medical committees to modify the National Health Program failed, even though they financed their own expenditures to Washington. The proponents of the program, however, were not content to allow the proposals to simmer in a committee and sought the aid of Senator Wagner, of New York, who is rightly proud of his record in social legislation. He, together with the ever-present non medical opportunists and some newly recruited medical colleagues, collaborated on the Wagner Health Bill.

In regard to the opposition by the American Medical Association of certain group health organizations, the speaker stated that there were only a few of four hundred such groups condemned. The reasons for such action lay in their attempts to bid for patients, their undercutting of fees and their promise to provide more than they could possibly give. It was this last criticism which was particularly stressed, since so few lay people are cognizant of what constitute necessary and adequate procedures.

As to the immediate future, Dr Fishbein stated that either a modified Wagner Bill or an entirely new plan of similar nature would be an administration measure in the next campaign, regardless of the victorious party. And during the respite given the American Medical Association by the Supreme Court's denial for a governmental appeal, Dr Fishbein promised that the Association would offer suggestions for the appropriation of federal money for those communities where there was actual need. For there are many localities in what the speaker called "the foremost country in medical service" where no aid is necessary under present conditions. It was offered as evidence of the good faith of the profession that it annually contributes \$365,000,000 for medical service, compared with a total expenditure by the government, with the exception of the Army and Navy, of \$120,000,000. Dr Fishbein did not deny the necessity of some improvements despite this generally adequate medical service, but claimed that an emergency did not exist and that the profession itself was entirely capable of solving its own

problem. One third of the nation is not, alleged the speaker without medical care. For although over 40 per cent of the populace have an income of less than \$1500 per annum 48 per cent of the population lives in rural areas and needs neither the same income nor as much for medical care as does its urban counterpart.

In conclusion Dr Fishbein maintained that the American Medical Association does not oppose the distribution of the cost of medical care so long as the integrity of the individual is maintained. He mentioned that true but appropriate quotation "He who barter liberty for security is likely to lose both"

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society with Dr. Soma Weiss presiding was held on November 14 1939 at the Peter Bent Brigham Hospital.

The first case presented was that of a fifteen-year-old girl who entered the hospital acutely ill with delirium a temperature of 104 F., and a painful swollen knee. Diagnoses of pyogenic arthritis, osteomyelitis and septicemia were made. Dr. William T. Green, in discussing the case, emphasized the importance of the care of the patient rather than an active surgical attack on the local disease in the early stages of a suspected osteomyelitis. Thus, the patient was treated with parenteral fluids, transfusions, sulfapyridine, immobilization of the affected limb and marsupialization of the suppurative knee joint. Early drainage and guarded motion of the joint were considered permissible whereas surgical intervention for the osteomyelitis in the contiguous femur was postponed until the patient's condition would warrant it. Dr. Green said that from the x-ray appearance of the bone lesion the joint infection was probably secondary to that focus. It was stated that the only way in which early drainage of osteomyelitis prevented subsequent complications was by its high mortality. In summarizing the treatment of staphylococcal septicemia, Dr. Green stated that multiple small transfusions and sulfapyridine offered the most promising results at present.

Dr. Chester S. Keefer was of the opinion that sulfapyridine was far superior to sulfanilamide in such cases. He mentioned the limited experience of Spink who had eight cures in 12 proved cases of staphylococcal septicemia as compared with the usual mortality of 80 to 85 per cent. In discussing the primary focus for the suppurative arthritis, Dr. Keefer stated that any staphylococcal joint infection without evidence of an external wound was invariably secondary to a contiguous osteomyelitis which had perforated the capsule.

The second case was that of a sixty-seven-year-old man who had entered the Peter Bent Brigham Hospital seven weeks before with a swinging temperature, night sweats, anorexia, weight loss and an exacerbation of his heart disease. In 1937 he had had a sudden attack of pulmonary edema and other signs of decompensated heart disease after eleven years of hypertension and a loud systolic murmur was heard for the first time. There was no history of rheumatic fever or congenital heart disease. In the intervening two years there had been intermittent attacks of decompensation successfully treated with digitalis, diuretics, barbiturates and paracentesis. The urine showed an increasing number of red blood cells, there were skin petechiae, and blood cultures showed profuse growth of *Streptococcus viridans*. Treatment consisted of sulfapyridine, which caused a marked temporary remission, and was then replaced by sulfanilamide, with an equally good temporary effect. Continuous intravenous heparin was employed until financial reasons caused its

discontinuance. Resumption of sulfanilamide following a respite caused an exacerbation rather than improvement.

Dr. Samuel A. Levine discussed the unusual case, which presented the unique features of an onset of subacute bacterial endocarditis during known congestive heart failure and of no predisposing cause such as rheumatic or congenital valvular disease. He did not believe that the therapeutic regimen carried out offered much promise.

The speaker of the evening was Dr. Chester S. Keefer whose subject was "Hemolytic *Streptococcus* Infections: Their importance in acute and chronic diseases." This was a résumé of some observations made by the speaker and his collaborators at the Thorndike Memorial Laboratory during the past six years. The toxic as well as invasive properties of *Streptococcus hemolyticus* were discussed together with its propensity for acute or chronic suppurative complications following a latent period. Dr. Keefer briefly mentioned the nine recently determined serological groups, with only Group A being significant for man clinically. The differentiation of at least 25 specific types within Group A has been accomplished by serological tests. Of 1150 strains of hemolytic streptococci studied at the Boston City Hospital from all available cases 95 per cent fell in Group A while only about 2 per cent belonged to each of Groups B and C. The Group B strains were usually found in cases of puerperal sepsis and those of Group C in wound sepsis, particularly in patients with diabetes. Last year at the Boston City Hospital 75 per cent of the scarlet fever streptococci were typable and showed a predominance of Types 13 15 16 and 17.

Dr. Keefer then went on to discuss the various phases of streptococcal infections their clinical manifestations and prognosis. The arbitrary divisions were a toxic phase, represented by the eruption of scarlet fever a septic phase, such as a lymphangitis and cellulitis a latent phase of ten days to six weeks, without symptoms a phase of late non-suppurative manifestations and finally overwhelming septicemia. The reason for the localization in certain cases was attributed to a bacterium which was noninvasive or of low virulence or to an increased resistance of the host as the result of specific antibodies. The importance of the local inflammatory fixation, even in the presence of circulating antibodies, was stressed.

The complex mechanism of recovery was examined, and its puzzling contradictions discussed. In most cases with a favorable outcome a co-operative activity of both local resistance and specific antibodies could be demonstrated. Some patients, however were known to recover without demonstrable antibacterial antibodies although they might have circulating antitoxin against the streptococcal products. Furthermore, the antibody titer was usually elevated for from one to six months after recovery even in those cases with exacerbations. Generally however an increase in demonstrable antibodies was shown to favor recovery.

Dr. Keefer's next consideration was the stage of septicemia, in which the use of chemotherapy had markedly reduced the mortality from its former value of 75 per cent. Three peaks of incidence were described, that of the first decade resulting from nose and throat foci that in the third and fourth decades being attributable largely to puerperal sepsis and that of later life complicating cellulitis. The course was variable there were cases of fulminating sepsis with death in three to five days and with no demonstrable antibodies there were patients who sterilized their blood stream and never developed metastatic lesions a third group had temporary clearing of the blood with later metastases, where the eventual outcome de-

pending on whether these secondary foci could be drained adequately, and finally there was the group who develop secondary bacteremia and die in two to three weeks. Emphasis was laid on the fact that focalized infection indicates the presence of adequate antibodies.

Discussion of the controversial mechanism of the late nonsuppurative manifestations of hemolytic streptococcus infections consumed much time and attention. The hypothesis of Pirquet and Schick that the reaction results from any antigen-antibody reaction must explain away the presence of this situation in all convalescent patients. Dr. Keefer suggested that those who fail to demonstrate these complications destroy their antigen before sufficient antibody titer is built up. Although such a mechanism might explain the latent period, it failed to elucidate the reason for the characteristic distribution of the lesions. Drs. Keefer and Mallory attempted to evaluate the presence of reactions in the tissues. It was found that those who succumbed early showed numerous bacteria in the interstitial tissues of the various organs and no reaction about them. In those dying on the sixth to the tenth day, however, bacteria were absent from the tissues, and a leukocytic reaction was present in areas corresponding to those previously invaded by streptococci. It was concluded that antigen was early disseminated throughout the tissues and fixed, while the later accumulation of antibodies caused a progressive tissue reaction. It was believed that this latter phenomenon was probably the same in the survivors.

Dr. James P. O'Hare opened the discussion by asking if such a theory was not in accord with Councilman's "acute interstitial nephritis." Dr. Keefer said that the lesions were identical with those described and pictured by Councilman. He did not agree, however, that acute interstitial nephritis never causes renal insufficiency.

Dr. Levine asked whether the late nonsuppurative manifestations were possible where no antibodies were demonstrated after a few days. Dr. Keefer agreed that Coburn's work seemed to indicate that a sharp antibody response was more prone to lead to recrudescences and said that the same had been found true by his co-workers.

Dr. Champ Lyons reported that specific antibodies were much more infrequently demonstrated in surgical streptococcal infections and that local inflammatory fixation probably plays a far more important role in such instances. Dr. Keefer agreed that there was a wide quantitative variance between the extreme medical and surgical cases, but emphasized the pressing need, therefore, for great caution in maintaining an intact local barrier in the necessary surgical treatment of such cases.

NOTICES

LECTURES AT THE FAULKNER HOSPITAL

A series of illustrated, public, health lectures at the Faulkner Hospital will be held in the hospital auditorium at 4:00 p.m. on Sundays. The schedule is as follows:

January 28—Diseases of the Rectum. Dr. Franklin G. Balch, Jr.

February 4—Heart Disease. Dr. Burton E. Hamilton.
February 11—Cancer of the Stomach. Dr. Marshall K. Bartlett.

February 18—Hay Fever and Asthma. Dr. Walter S. Burrage.

February 25—Surgery of the Blood. Dr. E. Everett O'Neil.

March 3—Surgical Diseases of Bone. Dr. John D. Adams.

March 10—New Drugs for the Treatment of Infectious Diseases. Dr. W. Richard Ohler.

March 17—Doctor, Will My Baby Be Normal? Dr. Charles P. Sheldon.

March 31—Eczema in Babies. Dr. Lewis W. Hill.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, January 31, from 2 to 4 p.m. Drs. Soma Weiss and Elliott C. Cutler will speak on "Obesity." A clinicopathological conference conducted by Dr. Elliott C. Cutler will take place from 4 to 5 p.m.

On Thursday, February 1, from 8:30 to 9:30 a.m., there will be at the Children's Hospital, a combined clinic, conducted by Dr. Frank R. Ober, of the medical, surgical, orthopedic, and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend.

FAULKNER HOSPITAL CLINICOPATHOLOGICAL CONFERENCE

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, February 1, at 5:00 p.m. There will be a discussion of cases by Dr. Thomas J. Anglem and Howard B. Jackson.

Interested members of the medical profession are invited to attend.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday evening, February 6, at 8:15.

Clinical papers will be presented by members of the staff of the New England Medical Center: Dr. Ethan L. Brown, Dr. Herbert I. Harris, Dr. Samuel Proger, Dr. William M. Shedden and Dr. S. J. Thannhauser.

MAX RITVO, M.D., *President*

DAVID B. STEARNS, M.D., *Secretary*

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held at the hospital on Thursday, February 1, at 7:15 p.m.

NEW ENGLAND PEDIATRIC SOCIETY

The next meeting of the New England Pediatric Society will take place on Wednesday, February 7. The clinical meeting will be held in the amphitheater of the Children's Hospital, and all the other events at Longwood Towers, Brookline.

WACHUSETT MEDICAL IMPROVEMENT SOCIETY

There will be a dinner and meeting of the Wachuset Medical Improvement Society at the Bancroft Hotel in Worcester on Wednesday, February 7, at 6:30 p.m. Dr. Edward J. O'Brien, Jr., of Boston, will speak on "Surgical Treatment of Prostatic Obstruction." Dinner will be \$1.25 per plate.

Members of the profession are cordially invited to attend.

LEROY E. MAYO, M.D., *Secretary*

PROGRAM

- 4:00 Clinical meeting
5:30 "Refreshments."
7:00 Dinner
8:00 Business meeting

Symposium Treatment of Meningitis.

- Treatment of Epidemic and Streptococcal Meningitis. Dr Josephine B. Neal, New York City
Treatment of Pneumococcal Meningitis. Dr Maxwell Finland.
Treatment of Influenzal Meningitis. Dr LeRoy Fothergill.
Discussion. Dr Kenneth D Blackfan.

Physicians are cordially invited to attend the clinical meeting and the symposium.

R. CANNON ELEY M.D., *President*
JAMES M. BATT M.D., *Secretary*

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|-------------|-----------------------|
| Lowell | February 2 | Albert H. Brewster |
| Salem | February 5 | Harold C. Bean |
| Haverhill | February 7 | William T. Green |
| Brookton | February 8 | George W. Van Gorder |
| Gardner | February 13 | Mark H. Rogers |
| Worcester | February 16 | John W. O'Meara |
| Pittsfield | February 19 | Francis A. Slowick |
| Northampton | February 21 | Garry deN Hough, Jr |
| Fall River | February 26 | Eugene A. McCarthy |
| Hyannis | February 27 | Paul L. Norton |

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at "The Hut," on Friday after noon, February 2, at 4:00. Dr J Dellinger Barney will talk, his subject being "More Progress in the Management of Urinary Calculi."

JOHN W. TRASK, *Medical Director in Charge*

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY JANUARY 28

SUNDAY JANUARY 28

- 4 p.m. Care of the Complexion. Dr. Perry C. Balrd, Jr. Free public lecture. Harvard Medical School, amphitheater of Building D.
4 p.m. Diseases of the Rectum. Dr. Franklin O. Balch, Jr. Illustrated, public, health lecture. F. Inner Hospital auditorium.
MONDAY JANUARY 29
12:15-1:15 p.m. Clinicopathological conference. Dr. S. Bert Wolfbach, Peter Bent Brigham Hospital amphitheater.
8:15 p.m. New England Heart Association. Beth Israel Hospital.
TUESDAY JANUARY 30
10-10 a.m. Anurysm and Rupture of the Ventricle of the Heart. Dr. W. N. Fulton. Joseph H. Pratt Diagnostic Hospital.
10 a.m.-12:30 p.m. Boston Dispensary tumor clinic.
12:15-1:15 p.m. X-ray conference. Dr. Merrill C. Soeman. Peter Bent Brigham Hospital amphitheater.
5 p.m. Hospital Research Council. Massachusetts General Hospital, Elber Dome.
WEDNESDAY JANUARY 31
12 p.m. Clinicopathological conference. Children's Hospital amphitheater.
2-4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.
THURSDAY FEBRUARY 1
8:30-9:30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital, at the Children's Hospital.

*5 p.m. Clinicopathological Conference. Faulkner Hospital.

7:15 p.m. Monthly clinical conference and meeting of staff. New England Hospital for Women and Children.

FRIDAY FEBRUARY 2

- 10 a.m.-12:30 p.m. Boston Dispensary tumor clinic.
12 m. Urological conference at the Massachusetts General Hospital lower amphitheater. Out Patient Department.
12 m. Clinical meeting of the Children's Medical Service, Massachusetts General Hospital. Elber Dome.

SATURDAY FEBRUARY 3

10 a.m.-12 m. Medical staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Samuel Weiss.

*Open to the medical profession.

JANUARY 26—Arlington and Belmont medical clubs. Page 122, issue of J. MAY 15.

JANUARY 27—Massachusetts Public Health Association. Page 122, issue of FEBRUARY 15.

JANUARY 28—Free public lecture. Harvard Medical School. Page 1042, issue of December 28.

JANUARY 28—Salem Hospital public lecture. Page 1042, issue of December 28.

JANUARY 28—Free public lecture. Quincy City Hospital. Page 77, issue of JANUARY 11.

JANUARY 28—March 31—Illustrated, public, health lectures. Faulkner Hospital. Page 164.

JANUARY 29—New England Heart Association. Page 122, issue of JANUARY 15.

JANUARY 30—Massachusetts General Hospital. Page 122, issue of JANUARY 15.

JANUARY 31—Joint medical and surgical clinic. Peter Bent Brigham Hospital. Page 164.

FEBRUARY 1—Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Page 164.

FEBRUARY 1—Monthly clinical conference and meeting of staff. New England Hospital for Women and Children. Page 164.

FEBRUARY 1—Clinicopathological conference. Faulkner Hospital. Page 164.

FEBRUARY 2—Staff meeting. United States Marine Hospital. Notice above.

FEBRUARY 3—Cancer of the Stomach. Dr. George Pack. Joseph H. Pratt Diagnostic Hospital. Page 122, issue of January 15.

FEBRUARY 6—Greater Boston Medical Society. Page 164.

FEBRUARY 7—New England Pediatric Society. Page 164.

FEBRUARY 7—Wachusett Medical Improvement Society. Page 164.

FEBRUARY 8—Tumors of the Bone. Dr. Bradley Coley. Joseph H. Pratt Diagnostic Hospital. Page 122, issue of January 15.

FEBRUARY 8—Penacuck Association of Physicians. 8:30 p.m., Hotel Baiter Haverhill.

FEBRUARY 11-14—International College of Surgeons. Page 739, issue of November 9.

FEBRUARY 22-24—American Orthopsychiatric Association. Page 957, issue of December 14.

MARCH 2, June 8 and 10—American Board of Ophthalmology. Page 719, issue of November 2.

MARCH 7-9—The New England Hospital Association. Hotel Statler Boston.

APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall Richmond Virginia.

MAY 10-18—American Scientific Congress. Page 1043, issue of December 28.

MAY 14—Pharmacopoeial Convention. Page 804, issue of May 25.

JUNE 7-9—American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

FEBRUARY 14—Cough, Sputum, Hemoptysis—How shall they be investigated? Dr. Revie H. Betts. Essex Sanatorium, Middlesex.

MARCH 6—Experimental and Clinical Considerations of Subthalamic Treatment of Hemolytic Streptococcus Infections. Dr. Champ Lyons. Lynn Hospital, Lynn.

APRIL 3—Addison Gilbert Hospital Gloucester.

MAY 8—Annual meeting. Salem County Club, Peabody.

HAMPSHIRE

MARCH 13

MAY 8.

Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Unicorn Country Club, Stoughton.

MIDDLESEX NORTH

JANUARY 31
APRIL 24
JULY 31
OCTOBER 30

NORFOLK

JANUARY 30 — Page 77 issue of January 11

NORFOLK SOUTH

FEBRUARY 1
MARCH 7
APRIL 4
MAY 2.

All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

MARCH 21 — Goddard Hospital Brockton
APRIL 18 — State Farm
MAY 16 — Lakeville Sanatorium Lakeville

SUFFOLK

JANUARY 31 — Scientific meeting Page 122 issue of January 18
MARCH 27 — Scientific meeting Symposium on Ulcerative Colitis and Diarrheas Under the direction of Dr Chester M Jones
APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

WORCESTER

FEBRUARY 14 — Worcester State Hospital
MARCH 13 — Worcester Memorial Hospital
APRIL 10 — Worcester Hahnemann Hospital
MAY 8 — Worcester Country Club

Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

Nomenclature and Criteria for Diagnosis of Diseases of the Heart The Criteria Committee of the New York Heart Association Fourth edition. 282 pp New York New York Heart Association, 1939 \$2.00

Précis de médecine des enfants P Nobécourt. Sixth edition 1303 pp Paris Masson et Cie, 1939 175 Fr fr
Jewish Contributions to Medicine in America From colonial times to the present Solomon R. Kagan Second edition 792 pp Boston Boston Medical Publishing Company, 1939 \$3.50

Vitamin D Chemistry, physiology, pharmacology, pathology, experimental and clinical investigations C I Reed, H. C Struck and I E Steck. 389 pp Chicago University of Chicago Press, 1939 \$4.50

Pléses gastriques et coliques doctrine—clinique thérapeutiques M Chiray and P Chêne 270 pp Paris Masson et Cie, 1939 75 Fr fr

Mineral Metabolism Alfred T Shohl 384 pp New York Reinhold Publishing Corp, 1939 \$5.00

The Employment of Fine Silk in Preference to Catgut The advantages of transfixing tissues and vessels in controlling haemorrhage William S Halsted. 34 pp Boston Welch Bibliophilic Society, 1939 \$3.00

Handbook of Skin Diseases Leon H. Warren 321 pp New York and London Paul B Hoeber, Inc, 1940 \$3.50

Accepted Foods and Their Nutritional Significance Council on Foods of the American Medical Association 492 pp Chicago American Medical Association, 1939 \$2.00

A Symposium on the Blood and Blood Forming Organs By fifteen authors 264 pp Madison, Wisconsin University of Wisconsin Press, 1939 \$3.50

Ways to Community Health Education Ira V Hiscock et al 306 pp New York The Commonwealth Fund, 1939 \$3.00

Polyomyelitis in the City of Melbourne, 1937-8 Hilda W Bull 56 pp Melbourne Health Committee of the Melbourne City Council, 1939 Complimentary

BOOK REVIEWS

Cardiovascular Diseases Their diagnosis and treatment. David Scherf and Linn J Boyd. 458 pp St. Louis. The C V Mosby Co, 1939 \$6.25

For the physician looking for a practical course in heart disease this book is as good as a trip to Vienna before the *Anschluss*. Indeed, much of the material might have been prepared from the lecture notes of the senior author, a distinguished Viennese cardiologist and teacher, now an émigré.

As thoroughly practical in its outlook as a bedside clinic, attention is constantly focused on the problem of the sick patient without the meticulous regard for classification so dear to the hearts of most textbook writers. The didactic method of presentation with no references makes for easy reading, although detracting from its value to the advanced student. It is rich with keen clinical observations and flavored with countless interesting therapeutic suggestions—not all of which will suit the fancy of Americans, who, ever since the days of Osler, have been skeptical about the effectiveness of drugs. Doubtless many a reader's eyebrow will rise at the recommendation of leeches to the thighs in coronary thrombosis for the prevention of venous thrombosis, locally for the treatment of thrombophlebitis and over the liver in acute hepatic engorgement.

The almost complete lack of illustrations is a pity, but the omission of electrocardiography from a book intended for practicing physicians is highly commendable. The authors state in their preface "Experience has shown that abbreviated discussions of electrocardiography serve mainly to confuse rather than aid the general reader." The book is of particular importance because in its approach to the subject it marks a distinct break from the British school, in which most of our native cardiologists have been nurtured.

Getting Ready to be a Father Hazel Corbin 48 pp New York The Macmillan Co, 1939 \$1.25

As its title intimates, this little book aims to instruct the prospective father as to his part in getting ready for the baby's arrival. To the man who does know something about it the approach will doubtless seem elementary. It really is, yet in many cases the most elementary instruction is what is most needed. The book may help some to feel that they are not quite useless encumbrances at the time of the blessed event, and that is something. Although simple, that which is said is perfectly sound.

Anatomy and Physiology Frederic T Jung, Anna R Benjamin and Elizabeth C Earle. 637 pp Philadelphia F A Davis Co, 1939 \$3.50

This book may be recommended as a textbook for study by nurses. In the presentation of the subject matter, the authors keep strictly to a middle course between brevity and fullness. Many four-color illustrations enhance the usefulness of the book. The paper is of good quality, and the diagrams and figures are well reproduced. A special feature of the text is the use of "correlative applications" at the end of the discussion of each topic.

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THE BONE LESIONS ACCOMPANYING CERVICAL SPINAL-CORD INJURIES*

An End Result Study of 76 Cases

DONALD MUNRO, M.D.,† and WALTER WEGNER, M.D.‡

BOSTON

A CASUAL review of the literature on "broken necks" emphasizes the confusion that exists as to the therapy and ultimate prognosis of this traditionally dangerous injury. As one's experience increases, one's pessimism grows less, however, and at the same time systematic segregation of the various elements involved becomes more and more imperative.

The therapy and prognosis of injuries of the cervical spine that do not involve the cord are quite different from those in cases in which cord injury plays a part. Such a study as that by Roberts' loses much of its potential usefulness because of his failure to take this into consideration. It is also essential, in our opinion, to differentiate the true acute cord injury which occurs at the time of the accident and the chronic lesion in which the damage to the cord takes place later. The latter may be a proper subject for fusion, as advocated by Cone and Turner. Nevertheless, success with these late cases does not, as these authors imply, justify the use of the same therapeutic procedure in acute cases, even though the original bone injury may have been the same. Furthermore, it is futile to use for cervical spine and cervical-cord injuries the methods of treatment that may be applied properly to analogous thoracic or lumbar lesions. Finally adequate length of follow up must be included as an essential part of the evaluation of the efficiency of any therapy. For these reasons we propose to discuss only cervical injuries, only those that are truly acute, only those in which there has been both bone and spinal-cord damage, and only the diagnostic therapeutic and prognostic aspects of the bone lesion.

Our series is made up of 76 cases. In 34 of them the patients died in the hospital in twenty four

hours to two years after admission, a mortality of 45 per cent. Thirty-eight patients were discharged from the hospital with varying degrees of recovery, and 4 are still under treatment.

GENERAL CONSIDERATIONS

As our experience has increased certain fundamentals have forced themselves upon our consciousness. None of them are new, and all have been mentioned by previous authors. Despite this however we are convinced that their importance is not generally recognized and that further discussion of them will be profitable.

The commonest and perhaps the least understood of these principles have to do with the mechanism of cervical dislocations. They are most apt to occur between the first and second and between the fourth, fifth and sixth vertebrae. The atlanto-axial dislocations occur because the articular facets of the axis and atlas are horizontal or nearly so, and therefore the maintenance of the position of one of these vertebrae on the other depends only on the integrity of the ligaments and odontoid process. Although the articular facets are more nearly vertical in the inferior part of the cervical spine, the usual site for dislocations is between the lower vertebrae.

Nearly all cervical spine injuries occur as the result of indirect violence which causes excessive flexion. The flexion occurs partly as the result of a protective reflex and partly because of the structure of the spine. The latter consists essentially of two parallel columns, one in front of the other. The anterior column is made up of the vertebral bodies and the intervertebral disks, and the posterior column of the neural arches. These include the pedicles, articular pillars, laminae and spinous processes. The anterior column is compressible, because of the elasticity of the intervertebral disks, but the posterior column is rela-

*Read at the annual meeting of the New England Surgical Society, 5 km. Massachusetts, September 29, 1939.

†Assistant professor of neurological surgery, Harvard Medical School; chief surgeon for neurosurgery, Boston City Hospital.

‡Assistant in neurological surgery, Harvard Medical School; associate surgeon for neurosurgery, Boston City Hospital.

tively rigid. Linear stress applied indirectly to the spine through a blow on top of the head causes compression of the anterior column, while the posterior column maintains its length but bends forward to accommodate itself to the shorter anterior column. As flexion increases, the linear force develops a forward component which produces a shearing stress on the articular facets (Fig 1). This shearing tends to produce dis-

duce the result shown in Figure 2, in which the bodies of the vertebrae are widely separated. We know from x-ray evidence that this does not occur

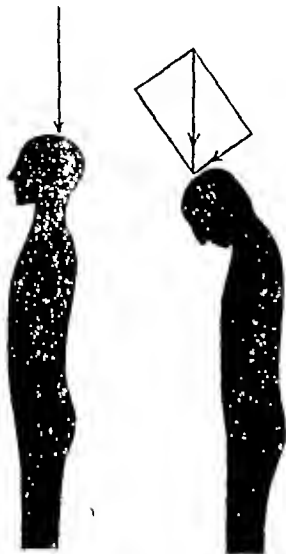


FIGURE 1

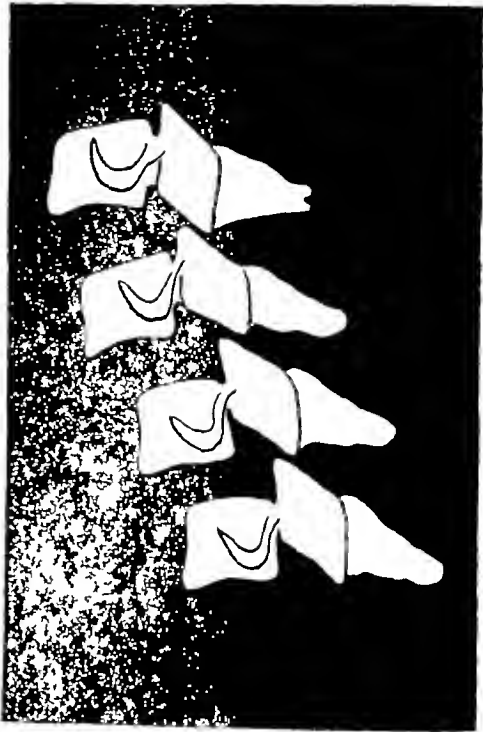


FIGURE 2

location, which is impeded by the oblique position of the facets and by the restraining ligaments and other fibrous structures, of which the intervertebral disks and the ligamentum flavum are the most important. The joint between the articular

when the uninjured neck is flexed, but rather that the anterior edges of the vertebral bodies come closer together (Fig 3). Such a motion is possible only if an additional tilting movement of the upper articular facet is exerted on the one below. Such tilting, if carried to excess, makes it

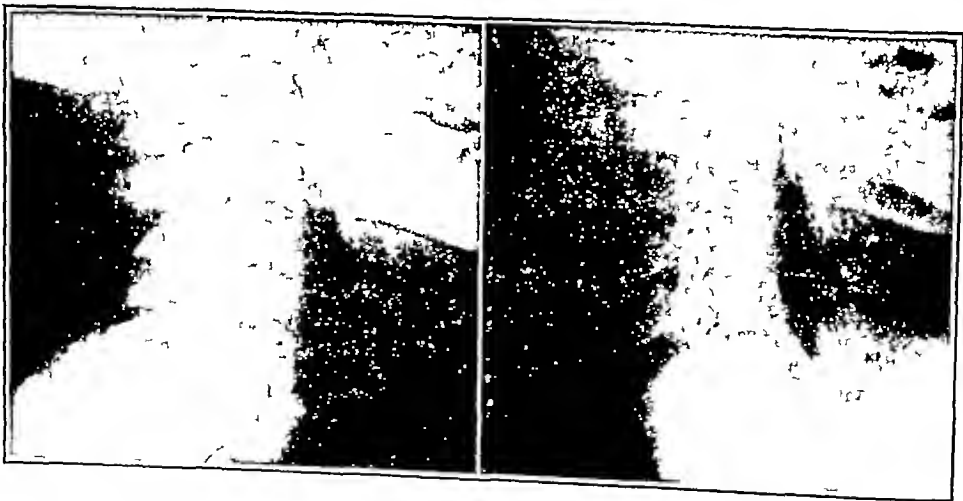


FIGURE 3

facets is enclosed in a loose capsule and has been described as arthrodial,⁵ which means that it has a gliding motion. If this were its only possible motion, however, an attempt at flexion would pro-

easy for the upper facet to override the lower, thus producing a dislocation without associated bone injury (Fig 4). Tearing of the intervertebral disk and the ligamentum flavum, however,

is apt to result. The stability of the neck following this type of injury is not augmented by such formation of callus as occurs when there has been extensive bone damage, and the dislocation is apt to recur if not fused. Regardless of type, we have



FIGURE 4

had only 7 cases of dislocation without associated fracture in the present series.

Any significant dislocation, and particularly the total variety of dislocation results in angulation of the vertebral canal (Fig 5). Thus, in turn, may cause pressure upon the cord at that point. It is nevertheless undoubtedly true that immediate partial to complete recoil of the partial dislocations may occur following the production of a degree

sionally supplemented by laminectomy and autopsy. Satisfactory visualization of the bone injury by x ray is difficult and often impossible. Attempts

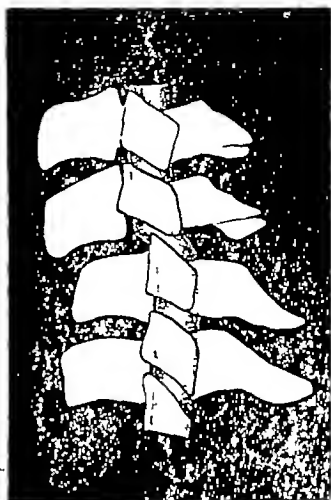


FIGURE 5

to take films should never be made unless the surgeon is present to see that flexion of the neck is avoided. Films should include lateral and antero-posterior views and a view through the open mouth. Cone and Turner have suggested that the base of

TABLE 1 *Diagnosis of Bone Injury*

| DIAGNOSIS | OUTCOME OF CASE | CERVICAL VERTEBRAE INVOLVED | | | | | | | X R vs N & C. vs | N X R vs | TOTAL |
|--------------------------|-----------------|-----------------------------|---|---|---|----|----|---|------------------|----------|-------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | |
| Dislocation only | Living | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 4 |
| | Dead | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 |
| Dislocation and fracture | Living | 2 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 10 |
| | Dead | 0 | 0 | 0 | 1 | 5 | 2 | 0 | 0 | 0 | 15 |
| Fracture only | Living | 0 | 0 | 2 | 1 | 7 | 3 | 1 | 0 | 0 | 22 |
| | Dead | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 9 |
| No diagnosis | Living | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 6 |
| | Dead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 |
| Totals | | 2 | 0 | 4 | 4 | 18 | 11 | 2 | 4 | 9 | 76 |

of cord injury that is inconsistent with the x ray findings at the time the patient is first seen.

Posterior dislocation of the cervical vertebrae is so rare as to be of no practical significance. It occurred only once in our series and was between the axis and the atlas. It followed a horizontal blow on the forehead and was accompanied by a fracture of the odontoid process.

DIAGNOSIS

The diagnosis of the bone injury (Table 1) has been made by x ray for the most part, being occa-

sionally supplemented by laminectomy and autopsy. Satisfactory visualization of the bone injury by x ray is difficult and often impossible. Attempts to take films should never be made unless the surgeon is present to see that flexion of the neck is avoided. Films should include lateral and antero-posterior views and a view through the open mouth. Cone and Turner have suggested that the base of the skull also be visualized. Traction on the shoulders may be required to show the sixth and seventh cervical vertebrae, and the roentgenologist should be given every assistance in his effort to obtain these difficult views. It is doubtless often impossible to show fractures of the articular facets even though oblique views are taken. We were able to visualize such a fracture only twice in this series.

TREATMENT

Treatment of the bone injury in this particular group of cases must be conditioned by the thera-

peutic needs of the damaged cord and the presence or absence of a spinal subarachnoid block. Since nearly all the injuries occurred in association with flexion, traction in hyperextension was usually provided at the start. The simplest, and we think the best, way of applying traction where only a moderate pull is needed is by a halter made of three-inch flannel bandage, as shown in Figure 6. This is led over a pulley at the head of

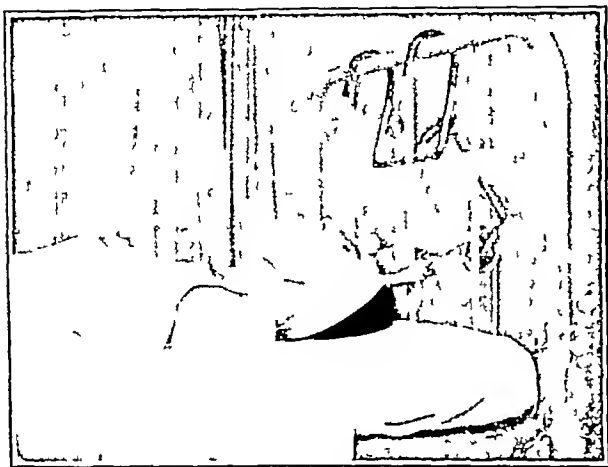


FIGURE 6

the bed and attached to a 5-pound weight. Flannel bandage is more comfortable and less apt to cause pressure sores around the chin and occiput than is the common leather halter. The chin is padded with lamb's wool, which does not become lumpy like cotton. The amount of traction that can be applied by this method is limited by the ability of the skin and the mandible to withstand pressure. Attempts to use more than a 5-pound weight have resulted in pressure sores of the chin and occiput, and in 1 case led to osteomyelitis of the mandible. Where greater amounts of pull were felt to be necessary, we have used Cone and Turner's² method (Fig 7). Traction is applied by a loop of rustless steel wire passed through two adjacent burr holes in the skull on either side of the midsagittal plane. A variation in the anteroposterior position of the burr holes alters the degree of hyperextension. Twenty-five or 30 pounds (in 1 case we used 60 pounds for twelve hours) can be suspended from such an arrangement for long periods of time, and with no discomfort to the patient. If necessary, a patient can even be set up in bed and the traction still be kept in place—a feature that is particularly useful for elderly people. Its disadvantages lie in the procedure necessary to apply it and in the occasional breaking of the wire or of the bone bridge between the trephine holes (each occurred in 1 case). Because of the handling necessary to apply it, this type of

traction was not used on acutely ill patients, and ordinarily not until after the first three days following injury. We have employed it in 7 cases.

Even with great weights, however, the method will not necessarily reduce a dislocation in which the facets are locked. This is particularly true if the direction of pull is in hyperextension. As Walton⁶ and subsequently Taylor⁷ pointed out, it is often well to begin traction in slight flexion, and to change to extension only after the facets have been so far separated as to permit the upper to slide backward into its proper position. This is especially true in complete dislocations, when the upper articular facets have become locked in front of the lower. We believe that it is safe to use Cone and Turner's method of reducing cervical dislocations even in the presence of associated fractures, and have done so.

We are opposed to the reduction of a dislocation by manipulation whenever there is an associated fracture of the laminae, pedicles or facets. Even with an ideal technic, such manipulations may cause unknown and uncontrolled shifts in the position of the fragments, with possible permanent damage to the cord. We have had occasion to use manipulation in 2 cases. One of the patients died a few hours afterward, and in the



FIGURE 7

other case the diagnosis was questionable. There was also 1 patient whose dislocation had been manipulated but not reduced before reaching us. He had no cord symptoms before the manipulation, but afterward there was quadriplegia with a complete block.

Even in the presence of a subarachnoid block and regardless of the bone damage, we no longer operate on cervical-cord injuries in the first few days after the accident. Although this change in policy happened to coincide with the introduction of tidal drainage⁸ and other improved methods of

handling these cases, it was probably the most important factor in reducing our mortality by 30 per cent (Table 2). However, if the subarach

TABLE 2. Influence of Laminectomy on Mortality Rate

| CLASSIFICATION OF CASES | 1930-1934 | | | | 1934-OCTOBER, 1939 | | | |
|-------------------------|--------------|--------------|-----------|---|--------------------|--------------|-----------|---|
| | NO. OF CASES | CASES OPENED | MORTALITY | % | NO. OF CASES | CASES OPENED | MORTALITY | % |
| Total cases | 30 | | | | 46 | | | |
| Cases operated on | 13 | 43 | | | 7 | 15 | | |
| Deaths within 72 hours | 13 | | | | 7 | | | |
| Total deaths | 19 | | 63 | | 15 | | 33 | |

noid block persists despite adequate traction and with or without reduction of the deformity, the cord is decompressed. In this connection it is worth while to note that we had 1 patient with a persistent spastic quadriplegia whose cord was not decompressed until ten days after the injury. A postoperative block developed, with subsequent symptoms suggestive of thrombotic transverse myelitis. This is in line with recent work on the circulation of the cord by Suh and Alexander⁹ and Herren and Alexander.¹⁰ The cord in the case noted appeared to be entirely normal and was not touched at operation. We believe that this may well represent the effect of allowing a block to go unrelieved for too long a period.

All our patients have been kept in traction for at least six weeks, and usually eight or nine. At the end of that time they are fitted with a leather cuirass having a high occiput but no forehead strap¹ or else, if there is x-ray evidence of sufficient bone repair and union to warrant it, a leather Thomas collar. Usually the patients have been allowed to remove the splint for the night after an other six weeks or two months. However, they have been made to wear it when upright and during the day until such time as there is x-ray evidence of solid bone union or repair at the site of the original fracture. They have been given no special exercises. We are opposed to the use of plaster-of-Paris jackets on account of their weight and discomfort, and the increased incidence of bed sores. We have never used one in an acute cervical-cord injury and the removal of several applied in other clinics has resulted in immediate improvement in the patients' condition. Moreover, 1 patient in this series came to us for treatment of a contusion of the cord with quadriplegia that had occurred during the application of a plaster cast. We believe that its use in cervical spine and cervical-cord injuries is dangerous and ordinarily contraindicated.

None of our cases have been fused. Excluding

5 patients who have been followed for less than six months, 2 who have been lost and 5 who are still in the hospital, we have 30 such patients who have been followed for one to fifteen years. Of these, 2 developed a recurrent late dislocation. In 1 case the dislocation was put back into correct position by skeletal traction, and there is reason to suppose that it will stay there. The other patient refused further treatment. Neither had any secondary cord symptoms. Contrary to Cone and Turner's² opinion, our experience has been that while, as they say, reduction is simple in the complex fracture-dislocations, under properly prolonged traction and splinting they are the least apt to slip and therefore the least in need of fusion. On the contrary,—and it was this condition that was present in our 2 cases in which slipping occurred,—dislocations without fracture are apt not to unite until late, because healing depends solely on ligamentous repair. They are prone to redislocate, and are therefore the cases *par excellence* for fusion.

Our experience with occipitodantlantoaxial and odontoid dislocations and injuries has been too small to justify any conclusions. Of our 2 patients—both with broken odontoid processes—one had an anterior and the other a posterior dislocation of the occiput and atlas on the axis. The anterior dislocation occurred in a chronically recurrent case with compression of the cord that eventually, after decompression, stabilized itself along the anterior aspect of the spinal column without any other fusion. The case with posterior dislocation is still on traction in the hospital.

All cord injuries regardless of the bone injury are placed on tidal drainage⁸ immediately after the patients' arrival on the ward. With the proper adjustment of the apparatus to the type of bladder it is serving, we have found it possible to do with our air, water, cork or other special mattresses. We believe Bradford frames to be distinctly harmful and unnecessary in the care of these cases. The patients can be turned more safely and come to less damage if kept on an ordinary mattress with the bed made up in the usual way and the drawsheet used to rotate them.

DISCUSSION

Age Distribution

The efficacy of any treatment that requires immobilization of the patient for six weeks or more may be materially affected by the age distribution of the group under consideration (Table 3). In this group of bone injuries associated with cervical-cord injuries, the effect of age on the efficacy of treatment was minimal and we do not believe

peutic needs of the damaged cord and the presence or absence of a spinal subarachnoid block. Since nearly all the injuries occurred in association with flexion, traction in hyperextension was usually provided at the start. The simplest, and we think the best, way of applying traction where only a moderate pull is needed is by a halter made of three-inch flannel bandage, as shown in Figure 6. This is led over a pulley at the head of



FIGURE 6

the bed and attached to a 5-pound weight. Flannel bandage is more comfortable and less apt to cause pressure sores around the chin and occiput than is the common leather halter. The chin is padded with lamb's wool, which does not become lumpy like cotton. The amount of traction that can be applied by this method is limited by the ability of the skin and the mandible to withstand pressure. Attempts to use more than a 5-pound weight have resulted in pressure sores of the chin and occiput, and in 1 case led to osteomyelitis of the mandible. Where greater amounts of pull were felt to be necessary, we have used Cone and Turner's² method (Fig 7). Traction is applied by a loop of rustless steel wire passed through two adjacent burr holes in the skull on either side of the midsagittal plane. A variation in the anteroposterior position of the burr holes alters the degree of hyperextension. Twenty-five or 30 pounds (in 1 case we used 60 pounds for twelve hours) can be suspended from such an arrangement for long periods of time, and with no discomfort to the patient. If necessary, a patient can even be set up in bed and the traction still be kept in place—a feature that is particularly useful for elderly people. Its disadvantages lie in the procedure necessary to apply it and in the occasional breaking of the wire or of the bone bridge between the trephine holes (each occurred in 1 case). Because of the handling necessary to apply it, this type of

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that age need be considered a significant factor if treatment is carried out as outlined

Spinal-Cord Injury

Obviously the outcome of the bone injury, in terms of usefulness, will depend on the extent of

TABLE 3 Age Distribution in Relation to Fatal Outcome

| DECADE | LIVING | DEAD | TOTAL |
|----------|--------|------|-------|
| 1-10 | 2 | 0 | 2 |
| 11-20 | 4 | 4 | 8 |
| 21-30 | 10 | 4 | 14 |
| 31-40 | 4 | 6 | 10 |
| 41-50 | 8 | 6 | 14 |
| 51-60 | 8 | 4 | 12 |
| 61-70 | 5 | 6 | 11 |
| 71-80 | 1 | 2 | 3 |
| 81-90 | 0 | 1 | 1 |
| Unknown | 0 | 1 | 1 |
| | yr | yr | |
| Youngest | 9 | 14 | |
| Oldest | 75 | 84 | |
| Average | 41 | 46 | |

the damage to the nervous system Table 4 is self-explanatory, and merely demonstrates that the more serious the cord injury, the less chance the patient has to survive

Cause of Death

We are uncertain as to the cause of death in cervical-spine and spinal-cord injuries. However,

TABLE 4 Type of Cord Injury in Relation to Fatal Outcome

| TYPE OF INJURY | LIVING | DEAD | TOTAL |
|---------------------------|--------|------|-------|
| Transection or crush | 0 | 9 | 9 |
| Compression | 1 | 0 | 1 |
| Contusion | 5 | 16 | 21 |
| Hematomyelia | 30 | 9 | 39 |
| Stab wound | 1 | 0 | 1 |
| Radiculitis | 1 | 0 | 1 |
| Cerebrospinal fluid block | 10* | 19 | 29 |

*In 4 cases block occurred without any other diagnosable cord injury

except in the case following manual reduction of the dislocation, we can say that the bone lesion is not a factor. The causes listed in Table 5 are symptomatic rather than etiologic.

End Results

As has been pointed out above, the end result of the bone injury itself has been fusion of a varying degree and with an approximation to normality except in 2 cases (Table 6). Crippling arthritis of the arms and hands, and less so of the legs, has prevented the attainment of the potentialities for recovery that have rested in the older patients. This has necessitated classification of some cases as having had an unsatisfactory end result. Those classed as satisfactory have been considered to be so by the patients themselves. They are able to care for themselves and get about freely, but not to earn a living. Those classed as well can earn their living in addition.

SUMMARY AND CONCLUSIONS

The therapy and prognosis of cervical-spine injuries which do not involve the spinal cord or are already chronic when first seen are quite different from those in which the cord injury plays a part and in which the patient comes for treatment immediately following the receipt of his injury.

Treatment of the bone injury in combined cervical-spine and spinal-cord injuries is condi-

TABLE 5 Presenting Symptoms at Time of Death in Fatal Cases

| LENGTH OF LIFE AFTER INJURY | RESPIRATORY | SURGICAL SHOCK | CIRCULATORY COLLAPSE | SECONDARY TO MANUAL REDUCTION | SEPSIS |
|-----------------------------|-------------|----------------|----------------------|-------------------------------|--------|
| da | | | | | |
| 1 | 9 | 2 | 0 | 0 | 0 |
| 2 | 5 | 0 | 0 | 1 | 0 |
| 3 | 3 | 0 | 0 | 0 | 0 |
| 4 | 2 | 0 | 1 | 0 | 0 |
| 5 | 2 | 0 | 1 | 0 | 0 |
| 6 | 2 | 0 | 0 | 0 | 0 |
| 7 | 1 | 0 | 0 | 0 | 0 |
| 10 | 1 | 0 | 0 | 0 | 0 |
| Over 10 | 2* | 0 | 0 | 0 | † |

*18 days and 1 month respectively

†12 days and 2 years respectively

tioned by the therapeutic needs of the damaged cord and the presence or absence of a spinal subarachnoid block.

Although undoubtedly influenced by the introduction and use of tidal drainage and certain

TABLE 6 End Results in Recovered Cases

| LENGTH OF FOLLOW UP | NOT SATISFACTORY | SATISFACTORY | WELL | DIED OF INTERCURRENT DISEASE | LEFT AGAINST ADVICE |
|---------------------|------------------|--------------|------|------------------------------|---------------------|
| In hospital | 5 | 0 | 0 | 0 | 0 |
| 3 mo | 0 | 0 | 2 | 0 | 1 |
| 5 mo | 0 | 2 | 0 | 0 | 0 |
| 8 mo | 0 | 1 | 0 | 0 | 0 |
| 9 mo | 1 | 0 | 0 | 0 | 0 |
| 10 mo | 0 | 1 | 0 | 0 | 0 |
| 1-2 yr | 0 | 1 | 2 | 1* | 0 |
| 2-3 yr | 1 | 3 | 0 | 0 | 0 |
| 3-4 yr | 0 | 4 | 1 | 1† | 0 |
| 4-5 yr | 0 | 1 | 1 | 1‡ | 0 |
| 5-6 yr | 0 | 1 | 1 | 0 | 0 |
| 6-7 yr | 0 | 0 | 2 | 0 | 0 |
| 7-8 yr | 0 | 0 | 2 | 1§ | 0 |
| 12 yr | 0 | 0 | 1 | 0 | 0 |
| 15 yr | 0 | 0 | 1 | 0 | 0 |
| 7 yr | 0 | 1 | 0 | 0 | 0 |
| Not followed (lost) | 2 | 0 | 0 | 0 | 0 |
| Totals | 9 | 15 | 13 | 4 | 1 |

*Arteriosclerosis with psychosis

†Cause unknown

‡Heart disease

§Cancer of rectum

other procedures, our mortality in cervical-cord injuries has dropped over 30 per cent since we have abandoned immediate laminectomy as a therapeutic measure.

In a series of 76 cases, 30 of which have been

literature, found not a single case of correct diagnosis

Since pain from ovulation and its concomitant phenomena is most frequently mistaken for appendicitis, we studied the relative incidence of the two conditions during two typical years at the hospital. In both 1935 and 1936 there were 39 cases of acute abdominal pain considered due exclusively to ovulation or to a ruptured corpus hemorrhagicum. In 1935 there were 556 cases and the following year 504 cases of appendicitis of all degrees occurring in women between the ages of thirteen and forty five, the age period when symptoms from ovulation occur. Thus in the latter class of hospital admissions there was an incidence of 1 case with pain from ovulation to every 13 of appendicitis.

In order to determine how frequently ovulation might cause discomfort in the abdomen, not severe enough to demand medical aid, we questioned for a month all gynecological patients who had normal menstrual regularity and found that 21 out of 134 patients, or about 1 in 6, frequently had abdominal pain of a minor degree midway between periods when ovulation would ordinarily occur. During this study we found that 53 of 134 patients (40 per cent) had some symptoms suggesting ovulation such as spotting, soreness of the breasts, leukorrhea or abdominal pain.

Our series, from 1926 through 1938, may be differentiated into three categories. First, there were 74 cases, including 15 which were discharged without operation, which could be considered as those of ruptured graafian follicles. The 59 operated cases in this group were characterized by an absence of free blood in the peritoneal cavity but by evidence of recent ovulation in the form of a distinct unruptured corpus hemorrhagicum. In this group nothing was done surgically to the ovaries. The unoperated cases showed mild symptoms which cleared up a few hours after entry.

Second, there were 165 cases of ruptured corpus hemorrhagicum, of which 139 were operated on. The operated cases showed evidence of free blood in the pelvis ranging from 1 to 120 cc. of sero-sanguineous fluid. The majority of these cases showed a small amount of blood and a ruptured corpus hemorrhagicum about 1 or 2 cm. in diameter. Of this latter group 39 patients were still oozing blood at the time of operation. All the corpus hemorrhagicum cases were treated by mattress suture.

In the third category there were 18 cases of corpus hemorrhagicum cyst, of which 13 had ruptured. Resection was done in all the cases of this group and the pathological diagnosis was corpus hemorrhagicum cyst or corpus luteum cyst with hemorrhage. Since we have not included any

cases with obvious signs of intra abdominal hemorrhage, so well described by other authors,¹⁻⁴ the cases in all three categories presented similar general symptomatology differing only in minor details.

The variable degree of discomfort caused by these conditions is shown by the fact that 30 per cent of the patients came to the hospital on the first day of their attack, 67 per cent within three days and the remaining 3 per cent anywhere from the fourth to the twenty-first day after the pain had started.

The difficulty in the management of many of these cases is well demonstrated by the fact that, of the 216 patients who were operated on, 58 were observed from three to nine days before operation was performed the other 158 were considered sick enough to justify operation on the day of entry or the next day. Those who were not operated on were kept in the hospital for two to four days before discharge.

The ages varied from ten to forty five years, with 73 per cent of the cases occurring between fifteen and twenty five. Single women comprised the larger part of the latter group. Many of the unoperated cases however, would tempt one to venture the opinion that single women had a lower threshold for pain than married women the latter being more liable to carry on through the discomfort without being hospitalized.

The time of onset in relation to the last menstrual period was determined in 162 cases. The pain started between the eighth and the twenty first day after the beginning of the last period. One hundred and thirteen, or 70 per cent, of these cases occurred between the twelfth and the sixteenth day after the onset of the last menses. The patients with ruptured graafian follicles invariably had their symptoms at the middle or in the early part of the intermenstrual interval. Many of the cases of ruptured corpus hemorrhagicum started at the middle of the cycle, but the majority occurred in the latter part. All the patients with corpus hemorrhagicum cysts had their symptoms about twenty-one days after the first day of the last period.

The pain was sharp and knifelike, at times radiating to the umbilicus but more often diffuse across the whole lower abdomen. In 12 cases there was pain in the back, and in 5 the pain radiated to the right knee. In the latter group more blood was usually found in the pelvis than is ordinarily encountered. The pain was distinctly intermittent, except in the cases with cysts, and tended after its acute onset to localize in the right lower quadrant of the abdomen even if the left ovary was involved. In our series there were 32 cases in which the left ovary was involved and

25 of these had right-sided pain. The pain seemed to subside considerably or completely in the recumbent position and was distinctly aggravated by exercise.

Trauma, such as that caused by walking, running, bending, coitus and getting out of bed, was elicited in 18 cases as a precipitating cause. This number would probably have been considerably larger had the patients been questioned more carefully regarding the relation of their attacks to some form of trauma, especially that of mild degree, which imperceptibly increases intra-abdominal pressure.

Our study would suggest that the cases with ruptured follicles had an acute onset, the acute stage lasting but a few hours, whereupon there followed a period, variable in length but usually brief, of discomfort in the lower abdomen. The cases of ruptured corpus hemorrhagicum after their acute onset were characterized by periodic alleviation of the pain, with acute exacerbations when the individual resumed activity. The symptoms in these cases tended to be intermittent but lasted a long time. The cases with more profuse bleeding were naturally severe, with the pain continuous rather than intermittent, and more closely simulated an acute abdominal emergency. The cases of corpus hemorrhagicum cyst seemed more gradual in onset, except in ruptured cases, and the pain was invariably steady without interruption. The cases of ruptured cyst were the most fulminating of all.

As regards gastrointestinal symptoms, vomiting was relatively infrequent, occurring in 73 cases, and was usually found only in the more fulminating cases. It came early in the attack and was never particularly distressing. Nausea was more frequently complained of and occurred in 155 cases. Anorexia was practically always a feature. The bowels as a rule were not affected. There were 12 cases of mild diarrhea occurring six to forty-eight hours after the onset of the attack, suggesting peritoneal irritation in the posterior cul-de-sac. Nothing very distinctive could be deduced from these data, but the vomiting had a tendency to be considerably less severe than that seen in the acute obstructive types of appendicitis, as suggested by Pratt⁶; on the other hand, it seemed to occur sooner after the pain than it did in the acute cases of appendicitis.

A history of previous attacks was elicited in 98 cases. In the ruptured follicle group, 39 patients (52 per cent) had had previous attacks, 31 having had several and 8 only one. In the ruptured corpus hemorrhagicum group, 52 patients (31 per cent) gave a history of previous similar trouble, 37 having had several attacks and 15 one. In the cyst

group, 7 patients (38 per cent) had had a similar previous disturbance, 4 having had several attacks and 3 one, the other attacks invariably occurred in the late part of the interval between periods. There were only 8 cases with a history of pain occurring at regular monthly or bi-monthly intervals, 6 of these being among the ruptured follicle cases which were not operated on.

Since the majority of such cases are confused with appendicitis, we were interested to see how many patients had had a previous appendectomy. In the entire series of 257 cases, only 6 patients had had their appendices removed. Of these, 1 case with pain on the left side and 2 cases with pain on the right side were diagnosed as ruptured corpus hemorrhagicum and the patients were discharged without operation. The other 3 were operated on, 1 case with left-sided pain being diagnosed as an ovarian cyst, and the other 2 with pain on the right side as adhesions and ectopic pregnancy, respectively.

The number of white blood cells varied from 4000 to 30,000. One hundred and sixty-four patients (64 per cent) had a count of 10,000 or less, 77 (30 per cent) had a count from 10,000 to 15,000, the rest (6 per cent) had counts ranging from 15,000 to 23,000. The white-cell count had a distinct tendency to fall in a short period of time or to stay elevated if there was much old blood in the pelvis.

The temperature varied from normal to 103°F, in most cases being about 99.6°F. In 30 cases (12 per cent) it was between 100 and 101°F. In 23 cases (9 per cent) it reached 103°F. The presence of old blood seemed to keep the temperature elevated.

The pulse varied but slightly from normal, and did not seem to rise commensurately with the temperature. Rarely was it above 100 beats per minute except in the few cases of ruptured hemorrhagic cyst, in which all the symptoms were more fulminating in type. After the initial onset the pulse tended to drop or remain stationary, in contradistinction to the patient with acute appendicitis, who tends to have a constantly rising pulse.

There was tenderness on deep pressure throughout the whole lower abdomen, particularly in the right lower quadrant, even if the lesion was on the left. Tenderness below McBurney's point was of considerable aid in differential diagnosis. Muscle spasm was conspicuous by its absence, as was rebound tenderness.

Vaginal or rectal examination, when done, usually showed slight tenderness in the affected vault, with occasional fullness in either fornix or the posterior cul-de-sac, depending on the amount

of blood present. The tenderness was distinctly low in the pelvis in the region of the involved ovary. Eight cases were considered to have a mass in one of the vaults and were diagnosed as cysts of the ovary.

The diagnoses made in the ruptured graafian follicle cases were as follows:

| | |
|----------------------------|-----------------|
| Ruptured graafian follicle | 15 (unoperated) |
| Acute appendicitis | 17 |
| Subacute appendicitis | 21 |
| Chronic appendicitis | 16 |
| Pelvic inflammation | 2 |
| Adhesions (postoperative) | 1 |
| Twisted ovarian cyst | 1 |
| Cyst of ovary | 1 |
| Total | 74 |

In the ruptured corpus hemorrhagicum series the following diagnoses were made:

| | |
|-------------------------------|--------------------|
| Ruptured corpus hemorrhagicum | 41 (26 unoperated) |
| Acute appendicitis | 55 |
| Subacute appendicitis | 47 |
| Chronic appendicitis | 12 |
| Ectopic pregnancy | 3 |
| Pelvic inflammation | 6 |
| Cyst of ovary | 1 |
| Total | 165 |

The cyst cases were diagnosed as follows:

| | |
|---------------------------------------|----|
| Ruptured corpus hemorrhagicum | 1 |
| Cyst of ovary | 4 |
| Acute appendicitis | 10 |
| Subacute appendicitis | 2 |
| No diagnosis (exploratory laparotomy) | 1 |
| Total | 18 |

From the foregoing data it is shown that the great majority of the cases in each group were confused with appendicitis—the milder forms in

Our study and the various articles written on acute abdominal symptoms following ovulation would seem to bring out certain features of distinct value in differential diagnosis. The important diagnostic points are:

History of previous similar attacks

Onset of pain within two weeks of due date of the next period.

Pain precipitated by mild trauma

Attack occurring in presence of other molar in a suggestive of ovulation, such as painful breasts, spotting and leukorrhea.

White-cell count at first elevated, tending to drop rapidly to normal

Tenderness 2 cm or more below McBurney's point.

Tenderness low in the pelvis by rectal or vaginal palpation

Omitting the cyst cases, both intact and ruptured, in which surgical intervention is invariably necessary we have charted (Table 1) the records of the Boston City Hospital showing the progress in the management of cases of ruptured graafian follicle and ruptured corpus hemorrhagicum, especially since publication of the excellent papers by Hoyt and Meigs⁷ and Wharton and Hendrickson⁸ in 1936. This chart demonstrates certain interesting facts. The ruptured graafian follicle cases have been reduced to zero presumably because these were recognized by the admitting surgeons and treated as outpatient cases. The increase in the average number of days the patients were observed before operation shows the more conservative handling of these cases.

The incidence of correct diagnoses increased, with a resulting decrease in surgical intervention. There still remained many cases in which surgi-

TABLE 1 Data Showing Advance in the Management of Cases

| Data | 1926-31 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | TOTAL |
|---|---------|------|------|------|------|------|------|------|------|-------|
| Not diagnosed preoperatively | | | | | | | | | | |
| Graafian follicle | 4 | 10 | 21 | 9 | 8 | 4 | 2 | 1 | 0 | 59 |
| Corpus hemorrhagicum | 4 | 6 | 15 | 5 | 6 | 20 | 13 | 7 | 10 | 86 |
| Diagnosed but not operated on | | | | | | | | | | |
| Graafian follicle | 0 | 1 | 1 | 1 | 1 | 6 | 4 | 1 | 0 | 15 |
| Corpus hemorrhagicum | 0 | 1 | 2 | 1 | 1 | 1 | 4 | 5 | 11 | 26 |
| Diagnosed but operated on | 0 | 0 | 2 | 1 | 1 | 3 | 3 | 2 | 3 | 15 |
| Diagnosis considered but patient operated on | 3 | 2 | 2 | 1 | 0 | 5 | 13 | 5 | 7 | 38 |
| Totals | 11 | 20 | 43 | 18 | 17 | 39 | 39 | 21 | 31 | 239 |
| Incidence of correct diagnoses (per cent) | 0 | 10 | 11 | 16 | 16 | 23 | 28 | 38 | 45 | |
| Average days of observation before operation | 1.3 | 1.5 | 1.5 | 1.6 | 1.5 | 3 | 2 | 3 | 3 | |
| Incidence of surgical intervention (per cent) | 100 | 90 | 95 | 88 | 88 | 82 | 79 | 71 | 66 | |

the ruptured graafian follicle cases and the more acute forms in the ruptured corpus hemorrhagicum and ruptured corpus hemorrhagicum cyst cases.

cal intervention seemed necessary even though the diagnosis of ruptured corpus hemorrhagicum was made. In the latter group there was invariably found a corpus hemorrhagicum still oozing blood

at the time of operation. Although the percentage of correct diagnoses is increasing and is as high as that observed in other clinics, we believe that our results will be even better as the importance of this subject receives more prominence. Unquestionably there will always be a certain number of cases in which differentiation from appendicitis is impossible, but with histories carefully taken and examinations thoroughly made with these conditions in mind, the number of operative cases can be considerably reduced.

CASE REPORTS

CASE 1 (No 820505) L. S., a 25 year-old, married woman, was admitted to the hospital complaining of acute intermittent pain in the right lower quadrant of the abdomen of a few hours' duration. The last period had occurred 2 weeks previously. There had been no previous attacks of pain.

At examination the temperature was 98.6°F, the pulse 84, and the white cell count 9000. There was moderate tenderness in the right lower quadrant. There was no spasm and no rebound tenderness. Pelvic examination was negative.

A diagnosis of ruptured graafian follicle was made, and the patient was discharged in 2 days without operation.

CASE 2 (No 803835) J. W., an 18 year-old, unmarried woman, was admitted to the hospital with a chief complaint of acute, intermittent pain in the right lower quadrant of the abdomen, accompanied by vomiting and of several hours' duration. The last period had occurred 2 weeks previously. There had been no previous attacks.

At examination the temperature was 99.2°F, the pulse 96, and the white-cell count 10,000. There was definite tenderness in the right lower quadrant over McBurney's point. There was no spasm and no rebound tenderness. There was slight tenderness in the right side of the pelvis by rectal examination.

The diagnosis was thought to be either subacute appendicitis or ruptured corpus hemorrhagicum, but surgery was deemed advisable. At operation there was found a small amount of serous fluid and an unruptured corpus hemorrhagicum in the right ovary. The appendix was normal.

Comment Cases 1 and 2 illustrate, respectively, the mild and the more severe symptomatology which may be caused by rupture of a graafian follicle.

CASE 3 (No 813540) M. D., an 18 year old, unmarried woman, was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen, radiating to the suprapubic region, of 6 hours' duration. Pain started during coitus. It was continuous and vomiting ensued shortly after onset. There was dizziness on standing and relief from the pain on lying down. The last period had occurred 26 days before onset.

Examination showed marked tenderness low in the right lower quadrant and over the symphysis. There was rebound tenderness and slight spasm. Vaginal examination showed marked pain on motion of the cervix. The right vault was tender, the left vault free, and no masses were felt.

At examination on admission at 4 a.m. the temperature was 98.6°F, the pulse 90, and the white-cell count 18,000. The white-cell count was 9000 at 9 p.m., and 8600 on the following day. An Aschheim-Zondek test was negative. The urine was negative.

The pain subsided on the day after admission, and the patient was discharged in 4 days with a diagnosis of ruptured corpus hemorrhagicum.

CASE 4 (No 897427) I. D., a 22-year-old, unmarried student nurse, was admitted to the hospital with a history of acute intermittent pain in the right lower quadrant of the abdomen of 24 hours' duration. The pain occurred directly over an old appendectomy scar. It did not radiate but became increasingly more frequent and severe. The patient vomited once and felt dizzy on two occasions. The last menses had begun 2 weeks before onset. For 4 years the patient had had dysmenorrhea and pain in the lower abdomen, lasting for 3 days to 2 weeks after her periods. An appendectomy had been performed 6 years previously.

On examination the patient was not acutely ill but complained of pain in the right lower quadrant of the abdomen. There was definite but not marked tenderness at the site of the old appendectomy scar. There was no spasm, mass or rebound tenderness. Slight radiation of tenderness was felt on palpation down to the middle of the symphysis. No rectal examination was made. The temperature was 98.6°F, the pulse 76, and the white-cell count 8500.

Surgical and gynecological consultants agreed on a diagnosis of ruptured corpus hemorrhagicum. The patient remained under observation for a week, during which time she had occasional slight pain on the affected side, and was then discharged without operation.

Comment Cases 3 and 4 are virtually textbook pictures of ruptured corpora hemorrhagica, the former demonstrating the value of repeated white counts, and the latter the importance of a good history.

CASE 5 (No C735366) T. P., a 17-year-old girl, was admitted to the hospital complaining of acute periodic pain in the left lower quadrant of the abdomen, radiating down the left leg, of 2 weeks' duration. There was no nausea or vomiting. The bowels were normal. The appetite was normal. There had been no previous attacks. The appendix had been removed 2 years previously. The last period had occurred 2 weeks before onset.

At examination the temperature was 99.8°F, the pulse 100, and the white-cell count 10,000. The urine was negative. There was tenderness in the left lower quadrant in the region of the left ovary. There was no spasm and no rebound tenderness. Rectal examination showed tenderness in the left vault.

A diagnosis of a ruptured corpus hemorrhagicum was made, and the patient was discharged in 3 days when the symptoms had subsided.

Comment This case shows symptoms persisting on the left side from which the ruptured corpus apparently came and also the ease with which these cases may be diagnosed if an appendectomy already has been performed.

CASE 6 (No 659307) M. O., a 14-year-old girl, was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen, without radiation, of 3 days' duration. There was no nausea or vomiting. The appetite was poor. The bowels were normal. The last period had occurred 3 weeks before onset.

At examination the temperature was 99.6°F, the pulse 120 and the white-cell count 11,200. The urine was negative. There was tenderness in the whole right lower quadrant, without spasm. Tenderness was elicited high in the pelvis on rectal palpation.

A diagnosis of acute appendicitis was made and an operation was performed the day of entry. The appendix

was found to be normal and a ruptured corpus hemorrhagicum was found in the left ovary with a small amount of free blood in the pelvis.

Comment This case demonstrates that the symptoms from a rupture on the left side may occur on the right side.

Case 7 (No. 649622) E. A., an 18-year-old unmarried woman was admitted to the hospital complaining of acute pain in the right lower quadrant of the abdomen of 5 days duration. There was nausea but no vomiting. The bowels were normal. The last period had occurred 2 weeks before onset. The patient had had two similar attacks lasting for 4 days.

At examination the temperature was 99.4 F, the pulse 106, and the white-cell count 9000. There was tenderness over McBurney's point, but no spasm. Tenderness in the region of the cecum was shown by rectal examination.

A diagnosis of acute appendicitis was made and an operation was performed on the day of entry. An acutely inflamed appendix was found together with free blood in the peritoneal cavity and a ruptured corpus hemorrhagicum in the right ovary.

Comment This case illustrates the extreme difficulty in differential diagnosis and the possibility that acute appendicitis may be present simultaneously with a ruptured corpus hemorrhagicum.

Case 8 (No. 777355) V. S., a 15-year-old girl was admitted to the hospital with a chief complaint of acute intermittent pain in the right lower quadrant of the abdomen without radiation of 24 hours duration. There was nausea but no vomiting. The last period had occurred 2 weeks previously. The patient had had several attacks.

At examination the temperature was 98.6 F, the pulse 80 and the white-cell count 17,000. There was tenderness in the right lower quadrant over McBurney's point. There was no spasm and no rebound tenderness. The rectal examination was negative.

A diagnosis was made of acute appendicitis or ruptured corpus hemorrhagicum. At operation a ruptured corpus hemorrhagicum, still oozing blood was found in the right ovary. There was considerable blood-tinged fluid in the pelvis.

Comment Whether to intervene surgically in the above type of case would tax the judgment of even the most conservative surgeon.

Case 9 (No. 644132) C. L., a 15-year-old girl was admitted to the hospital with a chief complaint of dull pain in the right lower quadrant of the abdomen of 3 days duration. There was no nausea or vomiting. The pain became gradually worse. The last period had occurred 3 weeks before onset.

At examination the temperature was 99 F, the pulse 96, and the white-cell count 7000. There was deep tenderness with slight spasm in the right lower quadrant. There was tenderness in the right vault on rectal examination. No masses were felt.

A diagnosis of acute appendicitis was made and an operation performed on the day of entry. There was found about 5 cc. of bloody fluid in the right side of the pelvis. There was a hemorrhagic cyst of the right ovary unruptured and about the size of a walnut. Resection of the cyst was performed.

Comment This case illustrates the continuous dull pain characteristic of the cyst cases, in contradistinction to the intermittent pain caused by a bleeding corpus luteum.

Case 10 (No. 661313) M. O., a 28-year-old, unmarried woman was admitted to the hospital complaining of acute pain below the umbilicus, radiating to the right lower quadrant of the abdomen of 2 days duration. The patient had vomited four times. The pain was constant and was somewhat relieved by flexing the right thigh. The last menses had occurred 26 days previously.

At examination the temperature was 99 F, the pulse 110 and the white-cell count 12,000. There was tenderness and spasm in the right lower quadrant. Rectal examination showed tenderness in the right vault. No masses were felt.

A diagnosis of acute appendicitis was made, and an operation was performed the day of entry. Considerable dark blood was found in the pelvis and a ruptured hemorrhagic cyst the size of a small orange in the right ovary.

Comment This case is a good example of the symptomatology accompanying a ruptured cyst when the fulminating symptoms of acute hemorrhage are absent.

SUMMARY

Two hundred and fifty-seven cases of pain due to ovulation and its sequelae are analyzed.

Differentiation from appendiceal lesions is shown to be the most difficult step in diagnosis.

The closer the attacks approach to the onset of the next period, the more severe the symptoms usually are.

Appendicitis and pain consequent to ovulatory phenomena may exist simultaneously.

The large percentage of cases of ruptured corpus hemorrhagicum, if diagnosed definitely, may be treated without operation but the possibility of persistent bleeding necessitating surgical intervention must be kept in mind.

In women where a diagnosis of the milder forms of appendicitis is made and differentiation is not positive, a midline instead of a right-rectus or McBurney's incision should be made, in order to simplify exploration of the pelvis.

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THE ESTIMATION OF THE NUTRITIONAL STATE IN CHILDREN*

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THERE have been many attempts to secure a suitable formula for use in the rating of the nutritional state. Data for weight, height, sex and age,¹ for weight, body build, age and sex,² and for arm, chest and hip measurements³ have been suggested. Magee⁴ advocates the substitution of measurements of physical performance for those of physical development. Harris⁵ suggests that determination of specific deficiencies in the vitamins and in iron, by means of laboratory tests now available, could be used. These proposals have various degrees of value for studying the state of nutrition, but there is doubt of their being both adequate and practical.

Be this as it may, there is considerable confusion and difference of opinion regarding the estimation of the state of nutrition in children. This point was well illustrated by Dunstan,⁶ of England, in 1937, and by Derryberry⁷ in 1938. Both reported the results of surveys in which a specified number of experienced physicians or pediatricians independently examined the same group of children and determined their nutritional states. The results showed such wide individual variations that both authors perceived a pressing need for a more exact measure of the nutritional state. The purpose of this paper is to present such a standard of measurement, which has been developed as a result of observations in a large number of children over a five-year period.

MATERIAL AND PLAN OF INVESTIGATION

The subjects used in this investigation consisted of 556 children between the ages of two and twelve, who were followed from 1933 through 1937. One group was composed of 287 children who attended the first four grades of a primary school in Revere, and were for the most part from families whose yearly income was from \$1000 to \$2000. Another group included 269 consecutive cases from the Outpatient Department of the Boston Dispensary, which gives medical service to a comparatively low-income section of the population.

Information concerning the physiological symptoms in the school group was gathered by a group of students§ from the Tufts College Medical School who visited the children's homes. The rest of the study was done by me.

A suitable standard for the appraisalment of

the nutritional state in children should not only be based on accurate principles but should also be practical and applicable to and adequate for every child. Apparently these requisites are fulfilled in the co-ordination of the physical and physiological aspects of the nutritional state presented in the following scale, which was applied to all cases in this series.

- A Physiological aspect or functional symptoms
 - a. Appetite
 - b. Activity
 - c. Character of stools
 - d. Sleep
 - e. Frequency of infection
- B Physical aspect
 - a. Family tendency or inheritance
 - b. Physical development
 - 1. Interval gain in weight and height
 - 2. Physical examination

The combination of A and B determines the nutritional state.

The definition of nutrition as "a study of food-stuffs and the biochemical processes which utilize them"⁸ can be interpreted by saying that the state of nutrition of a child is equivalent to his growth and function. Since growth is analogous to physical aspect, and since function is closely related to physiological aspect, it was thought that a clinical measure of the nutritional state could be evolved by appraising separately and then co-ordinating both the physiological and the physical aspects of each subject.

The reflection of the physiologic processes was ascertained by taking a history of the appetite, activity, character of stools, sleep and frequency of infection. These symptoms were used as an index to body function and were called functional symptoms. Their proper interpretation required the analysis of each symptom as a complete unit, and as a link in the chain of the entire group.

The physical aspect of nutrition was evaluated from an estimate of the inherited trends and from the physical development of the child. The latter included the increment of growth (a history of the interval gain in weight and height) and the clinical evidence obtained from a physical examination. Special emphasis was placed on the state of the soft tissues and skeletal structure and the presence of foci of infection.

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CLASSIFICATION

As judged by the nutritional scale described above, the cases fell naturally into three groups those with good, fair and poor nutrition. The groups were compared with one another as regards appetite, sleep, familial tendency, foci of infection, dietary deficiency and age. There were 332 cases in Group 1, 151 in Group 2 and 73 in Group 3. Group 1 included the children with excellent physiological and physical aspects. This meant that the biochemical processes were proceeding correctly, or that a state of good health was present. Group 2 included the children with some impairment of either the physiological or the physical aspects. It represented a transitional or intermediate state, which might improve to one of good nutrition or regress to one of malnutrition. Group 3 included children with impairment of both the physical and the physiological aspects. Undoubtedly some abnormal circumstance had impaired the operation of the biochemical processes, and a state of poor nutrition was present.

PROGRESS OF CHILDREN WHOSE NUTRITIONAL STATE CHANGED

The study of 30 children whose state of nutrition changed during the years of this investigation showed that the first sign of improvement in children with malnutrition under treatment resulted in an improved physiological state. The appetite improved, sleep was more restful, the bowel

this change varied from several days to several weeks.

Fair nutrition became good nutrition when the child developed normal physical signs. This

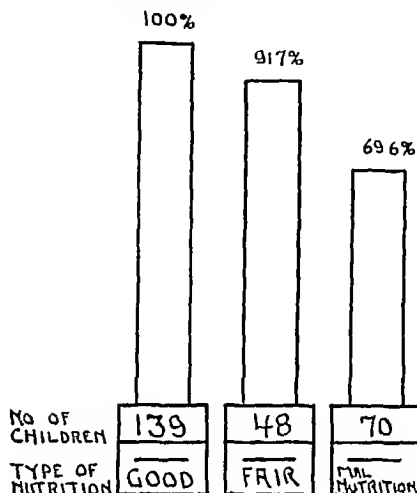


FIGURE 1 Percentage of Children with Adequate Appetites in Relation to the State of Nutrition

change usually required from four weeks to eight months.

Changing the child's nutritional state from good to fair required various periods of time, depend

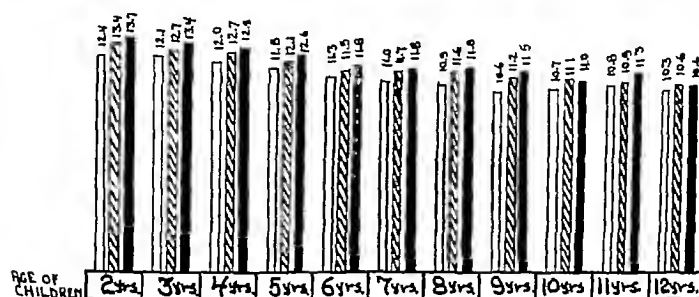


FIGURE 2 Required Daily Sleep in Relation to the State of Nutrition and to Age

The open blocks represent patients with good nutrition the cross-hatched ones those with fair nutrition and the solid ones those with malnutrition. The height of the blocks and the superimposed figures represents the hours of sleep required daily.

movements became regular, and fatigue lessened or even disappeared. After the functional symptoms had become normal the malnutrition changed to fair nutrition. The period of time required for

ing on the degree of infection or the dietary deficiency. The first sign of regression was a change in the functional symptoms, with impairment of appetite, sleep, activity and the character of stools.

Continued regression resulted in poor posture, poor tissue turgor and other signs of malnutrition

ASPECTS OF NUTRITION

Physiological

There was a clear relation between a child's appetite and his nutritional state. All of 139 children with good nutrition had good appetites. Eight per cent of 48 children with fair nutrition had poor appetites, while 30 per cent of 70 children with poor nutrition had poor appetites (Fig 1)

Children with good nutrition in the same age group generally required less sleep than did those with malnutrition (Fig 2). From the age of two to nine years there was a difference of one hour. From ten to twelve years there was prac-

subject to familial tendency, age, time of year, sex and the presence of infection. The gain in weight varied from 3 to 16 pounds per year. Although not accurately determined, it appeared that the gain in children with good nutrition was greater than that in the others.

There appeared to be no special significance between height and the type of nutrition.

The distribution and amount of skin, fat and muscle frequently showed marked variations in each child. The kind of skin was not specifically related to the state of nutrition. The tone of both muscle and subcutaneous fat was excellent in children in good physical condition, while those in poor physical condition had soft or flabby tissue turgor. Children with fair nutrition had tissue turgor that ranged from soft and flabby up

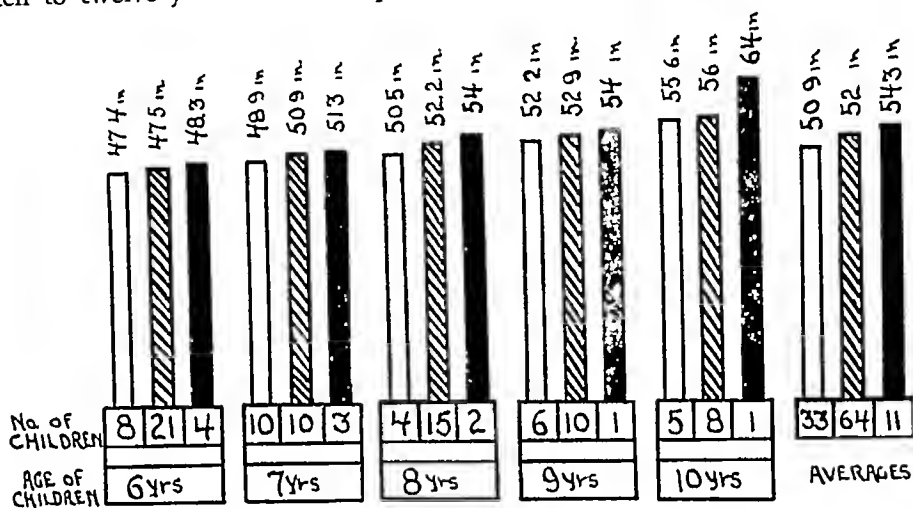


FIGURE 3 The Height of Children in Relation to That of Their Parents and to Age

The open blocks represent children with short parents, the cross-hatched ones those with parents of medium height, and the solid ones those with tall parents. The height of the blocks and the superimposed numbers represent the height of the children in inches.

ically no difference. In groups with similar nutrition there was only one hour's difference in the amount of sleep required daily between the ages of six and twelve.

Data concerning the frequency of infection and of fatigue in relation to the state of nutrition were not accurately recorded. However, it is our impression that infections and fatigue were distinctly more frequent in children with poor nutrition.

Physical

In the 108 children studied for the influence of heredity on height, the latter apparently followed the familial tendency in the majority of cases. However, 37 children were taller than the group average of children from parents in the next taller group (Fig 3).

The rate of growth was determined by observing height and weight changes over specific periods of time. These changes varied greatly and were

to the point when it became firm enough to be termed the equivalent of that in those with good physical condition.

The posture was usually dependent on the tissue turgor. In young children with poor tissue turgor resulting in the typical signs of poor posture, improvement in tissue turgor resulted in a gradual change to good posture. A distended abdomen was the last sign to disappear, and frequently years were required for this change to occur.

The relation between disease and the nutritional state was marked. Practically every child in the group with malnutrition had a focus of infection or a dietary deficiency (Fig 4). Thirty per cent of the outpatient children with fair nutrition had a focus of infection or a dietary deficiency. Forty per cent of the same group among the school children were similarly affected. Twenty-three per cent of the outpatient group with good

nutrition had a focus of infection or a dietary deficiency Seventeen per cent of the school chil-

ages the incidence of malnutrition gradually decreased, until it reached its minimum of 9 per cent at the age of eleven (Fig 5)

DISCUSSION

In determining the nutritional state each child was considered a clinical entity In attempting to interpret the physiological symptoms it was found that healthy children of the same group varied markedly in appetite, activity, sleep and gain in weight and height consequently they could not be judged by their group averages, which showed distinct variations This was illustrated by one six year-old boy with good nutrition, who required ten hours of sleep daily, while another boy of similar age and nutrition required thirteen

Intelligent interpretation of the physiological or functional symptoms requires their analysis both individually and as a group In this way proper emphasis can be placed on the exaggerated symptoms or those due to either an overestimation or an underestimation of a true functional state, both of which necessitate repeated visits in order to determine the true character of the symptoms

Heredity was found to influence definitely the type of skeletal structure in the child The familial tendency as regards the type of skeletal structure was determined by securing information about the skeletal structure of parents, grand parents, aunts, uncles, brothers and sisters The

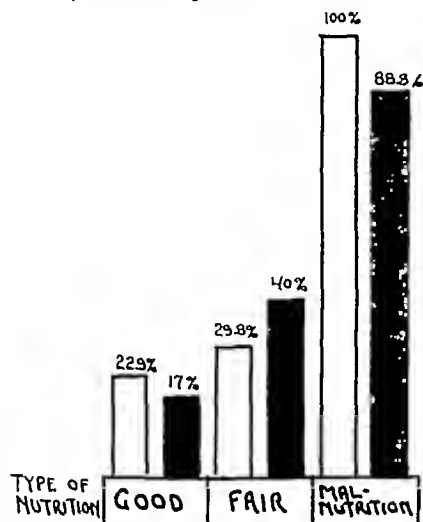


FIGURE 4 Percentages of Children Having Evidence of Dietary Deficiency or a Focus of Infection in Relation to the State of Nutrition

The open blocks represent children seen in dispensaries and the solid blocks school children

children with similar nutrition had a focus of infection or a dietary deficiency

Among the 242 children studied in relation to

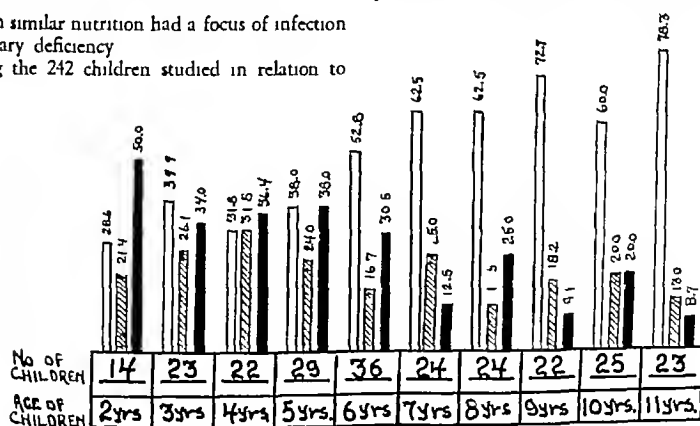


FIGURE 5 The State of Nutrition in Relation to Age

The open blocks represent children with good nutrition the cross-hatched ones those with fair nutrition and the solid ones those with malnutrition The height of the blocks and the superimposed numbers represent percentages

age and the nutritional state, the incidence of malnutrition appeared to be greatest at the age of two, when it was 50 per cent. At succeeding

type of skeletal structure during childhood and early adulthood gives most accurate information, for the sedentary life of adulthood frequently re-

sults in the general deposit of a layer of subcutaneous fat that masks the true skeletal contour

SUMMARY AND CONCLUSIONS

In an attempt to develop a practical and accurate standard for the estimation of the nutritional state in children, 556 children between the ages of two and twelve were studied during a five-year period. The estimation of the nutritional states was accomplished by analyzing and coordinating the findings of the physical and the physiological aspects of each child.

Application of this procedure produced three nutritional classes, described as good, fair and poor. "Good nutrition" included children with good physical and physiologic states. "Fair nutrition" included children with either the physical or the physiologic state impaired. "Poor nutrition" included children with impairment of both the physical and the physiologic states. The nutritional state became better or worse as the physiological symptoms and the physical signs improved or regressed.

Although the majority of children followed a definite familial tendency so far as height was concerned, 34 per cent of them did not.

There were fewer complaints of poor appetite as the nutritional state improved. The required daily sleep in children with a better nutritional state averaged about one hour less than that in those with a poor nutritional state.

Foci of infection and dietary deficiency were present more frequently in those with poor nutritional states. However, 20 per cent of the children with good nutrition had an apparent focus of infection or a dietary deficiency.

Good nutrition, which was least common in early childhood, gradually increased with age and was commonest in later childhood. Malnutrition, which was commonest in early childhood, occurring in 50 per cent of cases at the age of two, gradually decreased with age until it reached 9 per cent at the age of twelve.

The results suggest that this standard is practical and applicable to and adequate for every child. Moreover, with definite guideposts to follow in the interpretation of the nutritional state, there should be less confusion and variation in results than are now present.

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"COMMON COLDS"

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STUDIES among several groups of school children support the theory that a variety of microorganisms may act as the inciting agent in the production of upper-respiratory infections which are classed as "common colds." Groups of pronounced colds requiring numerous absences from school have been observed to appear consistently toward the end of the incubation period following the exposure of a class to a communicable disease spread through the secretions of the respiratory tract.

From October to June, I watched the interplay of colds and other communicable diseases in a nursery school of twelve pupils. Through the courtesy of the director, a daily notation was made for each child, throughout the school year, cover-

ing respiratory symptoms and the cause of any absence which occurred. The only series of colds for the entire year followed exposure of the children to chicken pox.

A three-year-old child attended school on November 5 and 6. The right nostril was red, and there was mucus in the left nostril. A diagnosis of chicken pox was made on November 7. On November 17, twelve days after the initial exposure, every other child in the class except two was kept at home for a cold. One of those remaining at school had mucus in the nostrils. The other had had chicken pox previously and went to bed with a cold one week later, the nineteenth day after exposure to chicken pox. We find, then, that within two or three weeks after exposure to

chicken pox every child in school had had a severe cold.

At no other time during the year did the group as a whole suffer from colds, nor were there any other cases of chicken pox, measles, scarlet fever, whooping cough, mumps or diphtheria. In several cases a child had sniffles or a cough which developed into a cold, but the infection did not affect the group as a whole.

This experience was sufficiently suggestive to make me think that observation of a larger group of children would be worth while. In a public elementary school, whose total enrollment was 598, I watched 160 children in the kindergartens and first grades from February 12 to May 28. In addition a second-grade class of 32 children was observed for a briefer period. The classes were followed during exposure to scarlet fever, measles and chicken pox. The same policy of notation for each child for each day was carried on.

In one kindergarten class of 33 children, which we shall call K_{Sa}, there were definite exposures to scarlet fever, measles and chicken pox. Here, too, the peak of respiratory symptoms seemed to come near the end of the incubation period of the disease to which there had been exposure. For example, seven days after the exposure of these children to scarlet fever by a child who vomited in the classroom and left school with a fever of 102°F, 12 children of this class exhibited symptoms of upper respiratory infection. Two other children developed scarlet fever within this week without further exposing the class.

The only other times when such a peak of upper respiratory symptoms was approached were fourteen days following a class exposure to measles, when 9 children had colds, nineteen days following an exposure to chicken pox, when 8 children showed respiratory symptoms, and twenty-one days following a second exposure to chicken pox, when the number again reached 8. These facts take on added significance when it is recalled that the incubation period for scarlet fever is from two to seven days, that for measles ten to fourteen days, and that for chicken pox two to three weeks.

It is interesting to note that on March 10, when among the 33 children in K_{Sa}, seven days after exposure to scarlet fever, there were 12 children exhibiting upper respiratory symptoms, the other four classes (124 children) which were being observed had a combined total of only 8 children either absent for a cold or showing upper respiratory symptoms.

The co-operation of the principal of this school, together with the help of the teachers and the school nurse, made it possible to continue observa-

tions during the next school year from September 8 to December 24 on a still larger group, made up of 318 children distributed among two kindergartens and three first grade, three second grade and three third grade classes. Causes of absences were noted, whether from communicable diseases, colds or otherwise, notations were also made of such upper respiratory symptoms as could be observed in the classroom during ten or fifteen minute daily visits.

During the period of observation, five classes participated in a definite measles epidemic. This fact makes the upper respiratory data difficult to follow. In general a peak of upper respiratory symptoms was found among the other children on the day that the new cases occurred. Five of six teachers in whose classrooms measles was prevalent were out with a cold from one day to a week during the period of the class exposure.

With the outbreak of measles in a classroom, it was noticed that upper respiratory symptoms were common among those who did not develop measles as well as among those who were coming down with the disease. Of 11 children known to be immune to measles in one second grade class, 6 had marked upper respiratory symptoms during the height of the epidemic. 3 had slight upper respiratory symptoms and 2 were well. In a first grade class which was subjected to two exposures to measles between March 21 and April 16, each of the 13 children immune to measles exhibited upper-respiratory symptoms.

During the fall of 1937 there was an incident in a fourth-grade class which is of interest. A boy was exposed to scarlet fever on September 9 by playing with a girl who on September 10 was diagnosed as having scarlet fever. He vomited on September 18, but was not otherwise known to be unwell except for having an earache. On October 14 he developed mastoiditis, for which he was taken to a hospital. There it was discovered that he was peeling, and a report was made to the principal that the boy had been attending school while having a mild case of scarlet fever. It is of interest to note what had occurred among his classmates. He was in school September 17 and also September 20 to 27, he was absent September 28 to have his ear treated. From September 20 to 29 11 children in this class of 37 pupils were absent with colds. At this time the other classes under observation in the school, from kindergarten through the third grade, were having excellent attendance, with very few absences on account of colds.

During the fall of 1937 a mild epidemic of chicken pox occurred in a first grade classroom of 29 children. On October 26, a boy was kept at

come with a diagnosis of chicken pox. Sixteen days from October 25, a second boy who sat diagonally in front of the first, began to show symptoms of chicken pox, and 8 other children either showed upper-respiratory symptoms in the classroom or were absent with colds. The third week after the first exposure to chicken pox, the class showed its maximum of absences for colds and upper-respiratory symptoms for any week from September 8 to December 24, 10 children had colds sufficiently severe to require home care. During this week among 289 children of the ten other classes being observed there were only 36 children who were absent for colds. Thus we see that with 10 absences from the first-grade classroom 34 per cent of the children were absent on account of colds, compared with 12 per cent in the ten other classes.

I recognize that no positive conclusions can be drawn from such data. But so frequently have the records shown an increase in the number of children having upper-respiratory symptoms toward the end of the incubation period following class exposure to certain communicable respiratory diseases that these organisms seemed to be indicated as the cause of such infections. This evidence suggests that the etiologic agents of various communicable diseases may manifest their presence, more frequently than is recognized, through symptoms usually thought of as those of the common cold.

Some of the recent public-health literature¹ suggests that the common cold is caused by a filterable virus, and that other organisms involved are always secondary invaders. In considering this filterable virus, it should be remembered that all that has been shown is that a single filterable virus can act as a causative agent in initiating cold-like symptoms. Common experience indicates that to accept the notion that a single virus is always the causative organism would lead to a false sense of security and many false expectations.

Certain well-recognized facts substantiate the belief that the causative organisms of upper-respiratory infections are various. In the first place, upper-respiratory symptoms may arise from several of the so-called "children's diseases." Measles is especially contagious when the catarrhal symptoms are manifest. Wagener² describes mild catarrhal attacks of measles during epidemics in adults who have had the disease. He believes these to be atypical cases. When measles appears first among aboriginal populations, it sweeps through them with a violence unknown among more civilized nations in which the disease has

been endemic for centuries. The symptoms of scarlet fever may be very mild; fever may be absent, the throat may be only slightly congested, and the eruption may be so slight as to be hardly recognizable. Yet mild as well as severe cases may be followed by serious sequelae. Scarlet fever is only one manifestation of streptococcal infection. It is well known that a typical case can infect a milk supply, with a resulting epidemic of septic sore throat. Adults and older children who have been exposed to scarlet fever sometimes develop only a simple tonsillitis.

In the second place, in all epidemics there are a large number of unrecognized cases. Such abortive and missed cases are commonly spoken of in epidemics of anterior poliomyelitis, scarlet fever, mumps, chicken pox, measles and whooping cough, and in the majority the presence of specific immunity can be demonstrated by proper laboratory procedures. In Palestine, colds are common but diphtheria and scarlet fever were once thought to be nonexistent. It has now been shown that both diphtheria and scarlet fever do occur, but in such a mild form that they were formerly unrecognized.³

Careful attention to the abortive forms of disease might help to interpret many so-called "colds." In pneumonia such unrelated bacteria as the pneumococcus and Friedlander's bacillus are able to cause very similar clinical and pathologic conditions. The possibility that various organisms are the etiologic agents for the common cold has important implications with respect to the care of colds. Perhaps physicians and parents who keep children at home and in bed for minor colds are in reality helping to abort other common communicable diseases which infect the upper-respiratory tract.

Special care of fatigue and attention to weather exposure near the end of the incubation period of a common communicable disease to which there has been exposure in the school, family or office may conceivably cut down the incidence of the common cold. If upper-respiratory infections called "colds" are due to various organisms, these infections will have different incubation periods rather than a constant one- to three-day period. The concept of the variable nature of upper-respiratory infections has far-reaching hygienic implications.

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REPORT ON MEDICAL PROGRESS

GYNECOLOGY PELVIC PAIN AND ITS RELIEF

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BEFORE presenting descriptions of and techniques for the various methods described in the literature for relief of pelvic pain, it is necessary that an abbreviated review of the nerve supply of the pelvic organs be given, for it is only by cutting or chemically injuring such nerves that conduction in the sensory nerves can be checked. In the latter part of the paper the use of the roentgen ray and of cobra venom as means of alleviating pain will be briefly discussed. Ordinary lesions in the pelvis which cause pain that can be relieved medically or surgically, such as inflammatory processes, cysts (torsion), benign tumors and so forth, are not within the scope of this presentation. The pain to be considered cannot be corrected by the usual medical or surgical measures; it is caused by such conditions as primary dysmenorrhea, a tuberculous bladder or one involved in the so-called Hunner ulcer (interstitial cystitis) or is due to inoperable malignant disease or to the sequelae of such disease.

THE NERVES OF THE PELVIS

The nerves that supply the pelvic organs—the bladder, perineum, vulva, vagina and anal regions are included in the term—are of three types: somatic or cerebrospinal sympathetic and parasympathetic.^{1, 2}

The somatic nerves under consideration are the pudic nerve, which with its branch, the perineal nerve, supplies the perineal regions, and the lower thoracic and upper lumbar nerves, which transmit sensory stimulation from the peritoneum. The uterosacral ligaments, real sources of pelvic pain are supplied by the lower lumbar and sacral somatic nerves. Thus peritoneal and lower pelvic pains are somatic in origin, and operations on the sympathetic system will not give relief to this type of pain. An example of this is the attempt to relieve pain by superior hypogastric (presacral) neurectomy following conservative operations for endometriosis. Resection of the superior hypogastric plexus will take care of pain due to involvement of the uterine body but it will not relieve pain due to involvement of the posterior peritoneum or uterosacral ligament. Furthermore, as the sym-

pathetic nerve supply of the ovaries and tubes, which are often involved in the disease, arises from the inferior mesenteric and ovarian plexuses, excision of the superior hypogastric plexus should not and does not give relief. Thus the importance of accurate knowledge of the nerve supply is obvious.

The low thoracic and upper lumbar sympathetic ganglia receive sensory fibers from the uterus, tubes, ovaries, bladder, sigmoid and upper rectum. Interruption of these nerves should give relief from visceral pelvic pain. The upper vagina, cervix (probably), uterus and a part of the bladder give off sensory nerves which pass into the inferior hypogastric nerves, then to the superior hypogastric plexus (presacral nerves) and then to the cord in the lumbar and thoracic regions. The sigmoid, upper rectum, tubes and ovaries, on the other hand, send their sensory supply through the inferior mesenteric plexus. The ovaries and tubes are also involved in the ovarian plexus. Thus, section of the superior hypogastric plexus will not give relief from visceral pain in any of the above named organs.

The parasympathetic nerves (nervi erigentes) are sacral nerves and carry sensation from the bladder and possibly the lower segment of the uterus and the cervix. Thus, in severing the nerve supply of a painful bladder due to tuberculosis, cancer or a Hunner ulcer (interstitial cystitis), simple excision of the superior hypogastric plexus will not suffice. Section of the parasympathetic fibers as they make their exit from the sacral foramina would relieve this pain but would also cause bladder paralysis and therefore is out of the question.

Knowledge of the sensory fibers of these three different systems is necessary before one can intelligently predict what to expect from the various operations advocated for the relief of pelvic pain. Much has been done by many investigators toward an understanding of pelvic pain and its relief, and credit is due to Learmonth,³ Montgomery and Counsellor,² Leriche,⁴ Cotte,⁵ Davis,⁶ Wetherell,⁷ White,⁸ Smithwick,⁹ Greenhill and Schmitz,¹⁰ Beck,¹¹ Scott and Schroeder,¹² and many others. The various operations are discussed below, and in so far as is possible an attempt is made to evaluate their success and the reasons for it.

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SECTION OF THE SOMATIC OR CEREBROSPINAL NERVES IN THE REGION OF THE PERINEUM

The painful itching of pruritus vulvae or kraurosis can be relieved by section of branches of the pudic nerve. This nerve divides into the perineal nerve and dorsal nerve of the clitoris. The perineal nerve divides into two branches, the first of which supplies the anal sphincter, and the other the perineum. This latter branch and its distal branches, important in perineal pain, are in contact with the posterior border of the transverse perineal muscle and run up over it to supply the perineum. Small branches proximal to the transverse perineal muscle also must be excised. These nerves may anastomose with others, such as the genitofemoral nerve, in supplying the perineum. Section of the nerves in this area, according to Learmonth, Montgomery and Counseller,³ will give relief to perineal pain, burning and itching.

SYMPATHECTOMY

Excision of the superior hypogastric ganglia (presacral nerves) is advocated for the relief of primary dysmenorrhea. This operation, first suggested and reported by Cotte,⁶ consists of resection of the superior hypogastric plexus in the retroperitoneal area from the bifurcation of the aorta to that of the iliac arteries. The operation interrupts sensory fibers coming from the uterus. It does two other things: it allows a marked vasodilatation of the vessels of the uterus, since the sympathetic fibers are inhibitors and cause vasoconstriction, and it improves the tone of the uterine musculature, for with sympathetic inhibition removed the power of the parasympathetic system to increase tone is given full freedom. Pain sensation from the uterus itself may be considered as due to contractions in an attempt to pass menstruum through a tight cervix or to the contraction of an ischemic or an underdeveloped uterus. In some cases this operation relieves pain in the bladder, especially if the pain is due to a lesion in the central part of the bladder floor or in the region of the trigone. It does not relieve the backache which accompanies dysmenorrhea, for on dilating the cervix after successful sympathectomy backache can still be produced.¹³ Thus the nerve supply of at least part of the cervix is not sympathetic in origin. In cancer, if the pain is due to uterine distention or stretching, this operation will give relief, but if the pain is due to involvement of the uterosacral ligaments or cervix, or to infiltration of the pelvic lymph nodes and the retroperitoneal regions, it is of no avail.

When resection of the superior hypogastric plexus is combined with removal of the lumbar

ganglia, a greater relief can be expected, for this operation interrupts a part of the inferior mesenteric plexus and, therefore, sensation of the sigmoid and upper rectum, a part of the tubes, and the ovaries. Only visceral pain can be relieved by excision of these nerves.

EXCISION OF THE SACRAL PARASYMPATHETIC NERVES

The neurones of the parasympathetic nerves run in the anterior divisions of the second, third and fourth sacral anterior nerves and enter the pelvis through the sacral foramina. The rami of these nerves, the nervi erigentes, pass through the inferior hypogastric ganglia. The nervi erigentes cause vasodilatation and increase bladder tone and open the internal sphincter. They also contain sensory neurones. Removal of the inferior hypogastric ganglia will relieve obstinate pelvic pain, but will paralyze the detrusor muscle and thereby prevent voluntary emptying of the bladder. The exclusion of parasympathetic action through resection of the inferior hypogastric ganglia should be used only in extreme cases or in those where a fistula is present. Combined with superior hypogastric neurectomy it will stop nearly all painful impressions coming from a tuberculous or cancerous bladder, but bladder paralysis must be expected.

ALCOHOL INJECTION

Two methods of injecting alcohol into the subarachnoid space have been suggested. In the first, the injection is done one side at a time, with the patient lying on one side or the other,¹⁰ and in the second (White⁸), the injection of the alcohol is made with the patient in the prone position with the hips elevated. The alcohol injures the sensory fibers of the dorsal roots. This eliminates pain from the region supplied by those roots. It is usually stated that alcohol injection rarely causes injury to motor fibers, since they are more resistant to alcohol than are the sensory fibers. In the first method the patient is placed on her side on the operating table, with the hips elevated by means of a pillow or sandbag. She faces slightly ventrally, thus elevating the region of the dorsal or sensory roots. A lumbar puncture is done in any interspace from the first to the fourth or fifth lumbar, and 0.5 to 0.7 cc of 95 per cent ethyl alcohol is injected. The patient is kept in this position for one or two hours. If the injection is satisfactory it will relieve pain in the pelvis on the side injected. Injection of one side is occasionally sufficient, but it is usually necessary to inject the other side at another time in the same way, thus blocking the dorsal roots on both

sides. Sometimes the function of the bladder is interfered with so that incontinence occurs, and injury to motor roots may result, with subsequent leg weakness. White advocates placing the patient in the prone position with the hips elevated—the old Kraske position. The injection of 10 to 12 cc. of sterile absolute alcohol is made between the fourth and fifth lumbar vertebrae or between the fifth lumbar and first sacral vertebrae. The alcohol, being lighter than the spinal fluid rises to the uppermost level of the spinal cord and injures the dorsal roots of the third, fourth and fifth sacral nerves. This gives an anesthesia of the vulva, perineum and bladder (parasympathetic supply), as well as the region of the anus and any other structures supplied by these nerves.

The type of pain for which such treatment is used occurs in women with vulval, vaginal or cervical cancer. No damage is done to the motor fibers running to the legs, but the anal sphincter is often damaged. Inability to urinate may be expected from the injection, because of the injury done to the parasympathetic nerves (nervi erigentes). Thus it is well to reserve low sacral cord injection for those patients who have bladder fistulas or incontinence.

These methods for relief of pelvic pain are successful in so far as they go, and all regions supplied by the lower lumbar and sacral nerves can be relieved by one or the other. It must be remembered, however, that pelvic regions supplied by uninjured lower thoracic or higher lumbar nerves and all regions supplied by sympathetic fibers are not relieved by this method. Sympathetic fibers which supply the viscera with sensation are not injured because of the fact that they enter the cord in the lumbar or thoracic areas. Thus, for pain due to carcinoma in the vulva or perineum and for that due to involvement of the lumbar and sacral nerves and the regions they supply, including the uterosacral regions, the cervix, the lower peritoneum, the vagina and so forth these methods of treatment are available, but for pain due to a lesion of the upper pelvic peritoneum, anterior or posterior, and for visceral pain alcohol injection is of no use. Schroeder⁴⁴ suggests combining the removal of the sacral sympathetic ganglia and of the superior hypogastric plexus and intrathecal injection of alcohol in order to obtain relief from bladder pain. Section of the sacral sympathetic nerves is not considered of much value in relief of pelvic pain. Incidentally in the Pondville Hospital, relief of pain due to cancerous extensions by this type of treatment has not been so satisfactory as that claimed by the various authors on the subject. The lumbar pain secondary to involvement of the ureter, with

consequent hydronephrosis, hydronephrosis and pyonephrosis, is not relieved by alcohol injection. Such pain is often low down in the flank and even in the suprapubic region. By study of the genitourinary tract this pain must be differentiated from that due to kidney lesions. Alcohol injection has its place in the treatment of pain due to malignant disease, but for benign lesions other methods of attack should be used.

CORDOTOMY

By cordotomy is meant the section of the anterolateral or spinothalamic tract in the cord. This is done after first exposing the cord by means of a laminectomy. The rationale of the operation is the interruption of those fibers in the cord that carry the sensations of pain and temperature. No motor fibers should be injured in this operation, though at times, owing to too radical an incision in the cord, section of some is inadvertently done. All visceral pain is not always relieved by this operation, because some of the visceral sympathetic fibers are deep in the cord and others ascend in different tracts. However, the persistence of pain is not a common occurrence, and if the operation has been done on both sides and the incision is carried deep enough, complete relief is usually obtained.

Cordotomy is often considered too formidable except for the unrelievable pain of cancer, but in some cases with intractable pain in the pelvis due to other lesions that cannot be approached surgically it is of great value. The relief of the excruciating pain of bladder cancer or that caused by involvement of the perineural lymphatics in the pelvis is possible by this means. This operation done on one side affects the contralateral side and, if the fibers are cut deep enough, gives anesthesia almost up to the level of the incision. To obtain a proper result the operation is usually done in the upper thoracic cord. There is seldom any permanent urinary difficulty resulting from the operation, as the somatic and the sympathetic motor fibers are not injured. Cordotomy is usually successful, and it is not done frequently enough or early enough in those patients that have incurable cancerous lesions. The operation is usually put off until the patient can no longer bear her pain, even with morphine, and is in poor condition. Then the operation is of very major consequence. Earlier and more frequent cordotomies should be used in those patients who are obviously going to die of their disease.

ROENTGEN RAY TREATMENT

It has long been known that roentgen ray treatment of metastatic cancer may be of value in elim-

inating pain for varying periods of time. It is probably not possible to cure cancer in the pelvis by means of such treatment, but reduction in the size of the metastatic lesions that have involved the pelvic nerves or are blocking the proper drainage of the pelvic viscera, thus causing visceral distention, is often possible. The latter is a frequent cause of pelvic pain. It is also true that involvement of bone with cancerous extensions is amenable to roentgen-ray treatment. When patients with cancer have masses that can be felt in the pelvic or broad ligaments, or when bone metastases are located by roentgenograms, the effect of roentgen-ray treatment should be tried. Often the relief from pain is great and tumor masses regress, but just as often no relief is obtained and the tumors grow in spite of all attempts to check them. It is then necessary to look to other methods of relief, such as alcohol injection or cordotomy.

COBRA VENOM

Recently, owing to the work of Macht¹⁵ and others, cobra venom has been used to check pelvic pain caused by cancer and its extensions. In adequate dosage there is no doubt that mild pain may be relieved and that patients thus avoid the possibility of becoming drug addicts. Its success in patients with pain due to invasion of retroperitoneal spaces, perineural lymphatics and bone is not so great, and failure in a large percentage is certain. However, there is no doubt that the use of large doses, as advocated by Rutherford,¹⁶ — the saturation of the patient with two to three ampules per day for seven to ten days, — will give an indication of whether its further employment is justifiable. If cobra venom can be used to replace or to supplement morphine it will be recognized as a very valuable method for combating pelvic pain.

DISCUSSION

All three nerve supplies to the pelvis — somatic, sympathetic and parasympathetic — are involved in pelvic pain. It is necessary to understand these nerve supplies in order to evaluate the various procedures outlined to check pain. In general, the removal of the visceral rami will relieve visceral pain, and alcohol injection will alleviate somatic pain, but each method may be entirely useless for the other type of pain. Cordotomy, which should relieve all pelvic pain, can miss visceral or sympathetic pain. Alcohol injection will relieve somatic or parasympathetic pain but not sympathetic. Local sections of cutaneous nerves are of value in the treatment of certain lesions, but

the exact nerve supply of each painful area must be fully understood before such sections are undertaken. Pelvic pain may be due to distention of a viscus or to a pull on it, while invasion may cause no pain at all. Inflammation of the pelvic peritoneum may cause backache (involvement of the lumbar or sacral nerves) or abdominal pain (involvement of the thoracic or intercostal nerves), depending on whether the posterior or anterior peritoneum is involved. Flank pain may be due to dilatation of the kidney pelvis because of ureteral obstruction secondary to cancer or fibrosis. The pain due to retroperitoneal connective tissue or peritoneal involvement can be relieved by alcohol injection, but flank pain due to renal involvement cannot.

CONCLUSIONS

An understanding of the nerve supply to the pelvis and its viscera is essential in the treatment of pelvic pain. Sympathectomy, alcohol injection and cordotomy are each successful and have reasons therefor.

The use of roentgen rays is helpful in pelvic pain but rarely of enduring value.

Cobra venom will surely take its place in the attack on pain, because it is analgesic without being habit-forming.

Earlier and more frequent use of cordotomy is advocated for patients whose malignant lesions cannot be cured.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTHEMORTAL AND POSTMORTAL RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26051

PRESENTATION OF CASE

A sixteen year-old girl was admitted to the hospital complaining of headache.

About three weeks before admission the patient began having moderately severe, gradually increasing left frontal headaches, occurring usually in the afternoon and associated with occasional spells of dizziness. She had no other complaints and continued to attend school regularly until five days before entry when she fell while in the bathroom and struck the back of her head. When found by her mother a few moments later she was lying on the floor unconscious. She became conscious about ten minutes later, complaining of severe headache, neck pain and malaise. There was no scalp wound. A few hours later double vision, nausea, persistent vomiting and a stiff neck appeared. Three days before admission the patient was admitted to an outside hospital where examination revealed bilateral papilledema and a xanthochromic spinal fluid under 500 mm of water pressure, roentgenograms of the skull were reported as negative. She was transferred to this hospital for further studies.

Physical examination revealed a well-developed and nourished girl who was acutely ill. The skin was hot and dry. She complained of severe headache and pain in the back of her neck. The neck was hyperextended and stiff, with a positive Kernig. There was no localized skull tenderness or scalp wound. Examination of the heart, lungs and abdomen was negative. The pulse was irregular with numerous extrasystoles. The sensorium was clear. The blood pressure was 104 systolic, 66 diastolic. The eyes were tender, and there was increased ocular tension. There was moderate choking of both optic disks, more marked on the left, though the disk outlines could be made out, the veins were engorged, but no hemorrhages were noted. The visual fields were normal. The pupils were dilated and slightly unequal and reacted sluggishly to light and accommodation. There was weakness of horizontal outward motion of each eye, but no nystagmus. On opening the mouth the jaw deviated toward the left. The remaining cranial-nerve functions were normal. The reflexes were depressed but equal, an equivocal Babinski sign was found on the right.

The temperature was 102°F., the pulse 80, and the respirations 24.

Examination of the blood showed a red-cell count of 4,200,000 with 70 per cent hemoglobin (Tallqvist) and a white cell count of 13,500 with 85 per cent polymorphonuclears. The urine examination was negative. Blood Hinton and spinal fluid Wassermann tests were negative. Numerous spinal-fluid studies showed the following: there was xanthochromia, and the initial pressures ranged from 350 to 500 mm of water, the total protein readings were 50, 58, 103, 24, 29 and 21 mg per 100 cc., and the number of red blood cells 446, 495, 70, 4 and 4 per cubic millimeter, respectively, the white blood cells ranged from 94 to 0 per cubic millimeter. The sugars, chlorides and gold-sol determinations were essentially normal. A tuberculin (dilution 1:10,000) skin test was positive.

An electroencephalogram monopolar recording showed slow waves (3 and 4 per second) in the right frontal region and to a certain extent in the left frontal region. There was also some slow wave activity in the left occipital region. There was marked difference between the two sides, the left showing considerably more abnormal activity than did the right. Attempts to locate the source of this abnormal rhythm were not very successful, as it seemed to shift from the left occipital to the left frontal region. The report stated that the dominant rhythm was mixed with slow waves and that the voltage was slightly increased, localization of the lesion was questionable. Roentgenograms of the skull showed that the convolutional markings were not increased, the pineal gland was not visible. There were no unusual areas of calcification. The sella turcica appeared slightly deeper than usual. There was, however, no erosion of the clinoid processes, and it was thought possible that the appearance of sella was due to a congenital abnormality. Eleven weeks later repeat skull plates showed an increased irregularity of the sella, the posterior clinoid processes were tilted upward and appeared sharp. The coronal suture was relatively wide. There was no convolutional atrophy, and no areas of calcification. Ventriculograms taken thirteen weeks after entry showed dilatation of both lateral ventricles, as well as of the third ventricle. There was an unusually long pineal recess. Neither the aqueduct nor the fourth ventricle filled with air. The third ventricle showed slight displacement to the right. A 3.0 by 4.5 cm. mass was seen to protrude into the left ventricle and appeared to arise from the general position of the choroid plexus.

The patient ran a temperature of 101°F. for the first week of her illness, thereafter it was normal.

During this time sixteen lumbar punctures were performed for the relief of intracranial pressure. The left supraorbital nerve was novocainized for the relief of pain in the left forehead and nose. The neurological findings remained essentially the same, except that transient diplopia and slight lateral nystagmus with occasional right facial weakness appeared. Following ventriculostomy, the patient developed a severe frontal headache, with pain, numbness and weakness of the left hand and arm. The latter findings disappeared two hours after their onset, but the headache persisted. She was given x-ray therapy, 200 r daily for a total of 1200 r, to the lesion in the lateral ventricle. On the one hundred and twenty-fourth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR H HOUSTON MERRITT * This is a very unusual case and there is little in the history or examination to localize this lesion or to help us in determining its nature. Since study of the record indicates that the lesion was localized by encephalogram I should like to see the films before discussing the case further.

DR JAMES R LINGLEY The films were essentially negative, as the record states, except for some deepening of the sella turcica. The floor is pushed down slightly, and there is some questionable thinning of the dorsum and posterior clinoid processes. On the other hand, there is no increase in the convolutional markings, and no appreciable separation of the sutures. On the ventriculogram, however, the tumor was very well outlined. Here we have a moderately dilated left lateral ventricle. Projecting into the body of the ventricle you can see a sharply defined, smooth, rounded tumor defect. It is exactly in the region of the genu of the choroid plexus. Here you see the dilated third ventricle and the enlarged suprapineal recess, there is no filling of the aqueduct. There is definite evidence of a tumor projecting into the left lateral ventricle, and in view of the hydrocephalus and the failure of filling of the aqueduct, I should suspect there is an extension downward, which obstructs the aqueduct.

DR MERRITT Do you believe that this was a tumor and not a hematoma into the choroid plexus?

DR LINGLEY That was the differential we considered at the time. We have seen a number of hematomas of the choroid, as described by Dyke,¹ but we have never seen any so large as this one.

DR MERRITT That is the location where hematomas occur, is it not?

DR LINGLEY Yes, exactly.

DR MERRITT There is no doubt from the history that this patient was suffering from intracranial disease, but there is very little in the clinical history to help us localize the lesion. Significant factors on the examination that might help are also strikingly absent. Most of the signs given here are those one sees with increased intracranial pressure—dilated pupils that sluggishly react to light, and weakness of the outward motion of each eye, which is due to weakness of the sixth nerves.

What is the site and nature of this patient's lesion, and is the abnormality seen in the x-ray the actual lesion? In the first place it is obvious that associated with whatever abnormality existed there was also hemorrhage. The patient was relatively well until just a few weeks before the onset of the disease, and even then she was evidently not sick enough to be kept at home and attended school. The onset, with coma, was very dramatic, and when the patient became conscious there were signs of meningeal irritation—stiffness of the neck and hyperextension—and lumbar puncture performed at another hospital showed a xanthochromic fluid. It does not state whether it was a slight or marked degree of xanthochromia or how many, if any, red blood cells were present in the fluid. When examined here a few days later, the signs of meningeal irritation were still present and the spinal fluid was still xanthochromic and contained a small number of red blood cells, with some white cells, which were probably the result of irritation of the blood or possibly secondary to the presence of a tumor. It is noted that the tuberculin skin test was positive. That may have some significance. The electroencephalogram did not seem to help in localizing the lesion, it was believed that there was probably more abnormality on the left, but also some on the right. The ventriculogram showed, in addition to the mass, a shift in the position of the third ventricle. I should like to ask Dr Lingley if he considers this to be of a significant degree?

DR LINGLEY Yes, there is also a definite elevation in the floor of the lateral ventricle on this side in the posterior portion of the third ventricle.

DR MERRITT We have to consider then what lesions in this location could give such a symptomatology. The ventriculogram did not show the aqueduct or the fourth ventricle. This may have been due to one of two factors: first, these structures sometimes are visualized very poorly in a ventriculogram, second, it may be, as Dr Lingley has pointed out, that a tumor is extending downward and shutting off the aqueduct, thus prevent-

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ing the filling of the fourth ventricle and producing a hydrocephalus

What kind of tumors occur in the lateral ventricle? The commonest ventricular tumors are colloid cysts, but they occur only in the third ventricle, since they probably represent rests of the paraphysis. The tumors that do occur in the lateral ventricle are various. They may be hemangiomas or meningiomas of the choroid plexus, and sometimes there are carcinomatous metastases to the choroid plexus. However, this may not be a primary tumor of the choroid plexus, but primary in the brain and extending out into the ventricle. The brain tumors that extend out into the ventricle are chiefly the ependymomas, which arise from the ventricular lining and may also extend into the brain. It is conceivable that a polar spongioblastoma or astrocytoma might also do the same.

I should be happy about the diagnosis of tumor if there had not been such a dramatic onset to the symptoms. With the exception of slight disability three weeks before the patient was well. The sudden onset suggests intracerebral hemorrhage, however, it hardly seems possible for an intracerebral hemorrhage to produce this type of ventricular disturbance. If we could be sure the lesion shown in the ventriculogram is not a hemorrhage into the glomus caused by the trauma of ventricular puncture then we could exclude cerebral hemorrhage. But if it is a hemorrhage into the glomus secondary to ventriculography cerebral hemorrhage must be considered. Where could a hemorrhage originate in order to give these symptoms? In the first place, hemorrhage in a sixteen-year-old girl is rare, but not unknown. Parenthetically, tumors in the hemisphere of a girl of this age are also rare. There is nothing to indicate that this patient could have had hemorrhage into the hemisphere of the brain. There was no paralysis, no aphasia and no disturbance of the visual fields. Could she possibly have had hemorrhage into the cerebellum? That could cause a dilatation of the ventricular system and the symptoms that she had. It is extremely unusual for a person with a hemorrhage in the hemisphere or into the cerebellum to live as long as this patient did—one hundred and twenty-four days. Hemorrhage of any size usually kills before that time. It is possible that the lumbar punctures prevented such an occurrence. I believe that the two most likely diagnostic possibilities are primary tumor of the nervous system, extending into the ventricular system, and intracranial hemorrhage, probably in the cerebellum. The latter diagnosis does not explain the pushing up of the left lateral ventricle and the shadow

in the ventricle, unless we say it is not a tumor but hemorrhage due to puncture. I think, however, that we have to take the x-ray evidence first and say that the shadow is a tumor and that this patient had a neoplasm of the brain which extended into the ventricular system and was probably a primary tumor of the choroid plexus with some hemorrhage from the tumor.

DR. JAMES B. AYER. I am a little surprised that Dr. Merritt did not include in his differential diagnosis the commonest cause of hemorrhage, namely spontaneous meningitic hemorrhage from an aneurysm. It was this diagnosis which was entertained for many weeks, for although there was intermittent hemorrhage the choked disks receded. It was only after a long period that we were convinced that this diagnosis could not be further entertained and we were willing to accept the hazards of a pneumoencephalogram to demonstrate a possible tumor.

Personally I was surprised when the evidence for tumor was substantiated.

DR. W. JASON MIXTER. I think what Dr. Ayer says is perfectly true so far as it concerns the patient when she entered the hospital. At the same time I believe that after knowing the entire story particularly the x-ray findings Dr. Merritt's contention that one need not take into consideration subarachnoid hemorrhage is correct. Probably we ought to have considered neoplasm earlier than we did on account of the fact that the tumors of the lateral ventricle are prone to show very little in the way of symptomatology. We have been fooled on several of them. I do not know what the pathologic process was, and I shall be interested to hear. In one of the other cases in which I have been particularly interested the diagnosis is still in doubt and lies between intrinsic tumor of the brain itself and endothelial sarcoma.

DR. TRACY B. MALLORY. Will you tell us about the operation, Dr. White?

DR. JAMES C. WHITE. There were two operations. When this patient came in here, the spinal fluid pressure was nearly 500 mm. She was losing vision very rapidly, and we did a ventriculogram, as there were no satisfactory localizing signs. This disclosed a round tumor in the posterior portion of the left lateral ventricle. Dr. Kubik then showed us a specimen in the museum with a history that was almost identical with this—intermittent bleeding and a tumor in the same region which was so vascular that any attempt to operate would have caused death on the operating table. That was a hemangioma of the choroid plexus, with great vessels, some nearly 0.5

cm in diameter, and it was attached to the brain over a wide area, especially over the thalamus. We therefore gave this girl x-ray treatment in the hope that it might decrease the vascularity, but the pressure became so high we thought we would have to do a palliative operation to drain the obstructing hydrocephalus if we were going to keep on with radiation. Dr Jost Michelsen performed a ventriculostomy, as described by Stookey and Scarff.² That was successful inasmuch as it reduced the pressure from 600 to 300 mm., and she made a smooth recovery. But it became apparent on account of the size of the tumor that x-ray treatment was going to lower the pressure no further and that she would get gradual loss of vision and blindness. We therefore decided to tackle the main growth no matter how risky it might be. It was discussed with the family. One difficulty was that the tumor was in the dominant left hemisphere, and it was obvious that you could not avoid going through the back of the temporal lobe around the region of the supramarginal gyrus, which would produce a type of aphasia with difficulty in reading and forming ideas.

A bone flap was turned out over that area and the cortical vessels looked unusually large, so a biopsy was taken. The area selected to go through was about a centimeter below the Sylvian fissure. We had to make an opening 3 or 4 cm. long to expose the tumor, which lay about 1 cm. below the surface. There were no vessels going into it, and we had to go in to a depth of 7 cm. before we got to the central end of the tumor. We worked our way in carefully, wiping the brain away, and could identify normal veins on the medial side of the posterior portion of the ventricle. There were also large communications to the choroid plexus, which had to be clipped. Following the removal of the mass there were some interesting disturbances in the blood pressure. At first the systolic pressure fluctuated from 60 to 80, and then during the closure, for no reason fell so low that it could not be obtained. A transfusion was given. During the next two days there were periods of tachycardia, fluctuation of blood pressure and a temperature of 105°F., without any evidence of infection and no polymorphonuclears in the spinal fluid. The patient was in deep coma. All these signs are attributable to injury of the hypothalamus. There was also a right hemiparesis, which we thought was due to postoperative edema of the internal capsule. If you should superimpose the tumor on a normal brain you would see that it must have run far forward as well as medially. These changes are straightening out now, and the patient has

her eyes open and follows you around with them, but is not yet speaking.

It is now ten days since operation, and it is time for the edema to begin disappearing. We hoped that she would be in better condition and more mentally awake than she is. She is rallying from the operation well, and we hope with time that the aphasia will not be too severe.

CLINICAL DIAGNOSIS

Hemangioma of the left choroid plexus

DR MERRITT'S DIAGNOSIS

Hemangioma of the choroid plexus of the left lateral ventricle

ANATOMICAL DIAGNOSIS

Hemangioma of the left choroid plexus

PATHOLOGICAL DISCUSSION

DR CHARLES S KUBIK The specimen from another case led to the diagnosis of hemangioma of the choroid plexus here. The former patient was a girl of fifteen. At autopsy there was a large intraventricular mass, most of this was old blood clot, but a small portion showed a cavernous hemangioma. There was a small hemangioma of the choroid plexus in the other lateral ventricle. The tumor that Dr White removed was an encapsulated semifluctuant tumor, weighing 46 gm. The capsule was very thick and firm. The inside of the mass was filled with blood clot, in which there was organization in the outer part, although the mass has been cut up in rather small pieces we have been unable to find any hemangioma inside of the capsule. There was some other tissue removed, however, in which there are numerous thin-walled blood vessels—unquestionably hemangioma of the cavernous type.

We have had one or two cases of hemangioma of the choroid plexus in infants. It is one of the less common causes of spontaneous subarachnoid hemorrhage, and in our autopsied cases we have had 3 or 4 with hemangioma of the choroid plexus as against about 25 with intracranial aneurysm. Looking back over the case now there was a clue, I suppose, in the fact that this patient already had papilledema when admitted, only a few days after the episode in which she lost consciousness. It is true, to be sure, that she had had headaches for about three weeks before that.

DR MERRITT I should like to add that the reason I did not suggest spontaneous hemorrhage was that there was not enough blood in the spinal fluid to consider primary subarachnoid hemorrhage.

DR KUBIK Yes, that is another feature which was different from the picture usually seen in cases with subarachnoid hemorrhage.

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CASE 26052

PRESENTATION OF CASE

First Admission A thirty-one year-old man was admitted to the emergency ward complaining of epigastric pain.

About three or four days before admission the patient suddenly had an attack of left upper quadrant and epigastric abdominal pain. The attack followed a heavy meal, and was associated with much belching and nausea, but with no vomiting or marked anorexia. He stated that a similar episode occurred four years before entry. He was then seen in an outside hospital where a diagnosis of ulcer was made, but without x-ray studies. He allegedly passed one tarry stool two years before admission, but none since. A blood Hinton test done seven years before entry was negative.

The patient had been a chronic arthritic for some twenty five years, and for twelve years had led a bed-and-chair existence. There were no other illnesses, past or present.

Physical examination revealed a thin, poorly developed and nourished, bedridden man whose spine was rigid, with a slight upper dorsal kyphosis. There were moderate flexion deformities of the elbows, hips and knees, with accompanying muscle group atrophy. Examination of the heart and lungs was negative. The epigastrium was slightly tender, but without spasm. The remainder of the physical examination was normal, as were the blood and urine. The blood pressure was normal.

The temperature, pulse and respirations were normal.

A gastrointestinal x-ray series showed no evidence of disease in the esophagus. The stomach had prominent mucosal markings and quite active peristalsis. In the lower part of the antrum on the side of the greater curvature there was a round, rather lobulated, small hemispherical, intramural, extramucosal tumor which measured 2.5 cm. in length and 1.5 cm. in height. The pylorus opened readily, filling a normal duodenal cap. He was discharged from the emergency ward on the second hospital day.

Second Admission (six months later) Four days before entry the patient was suddenly seized with an attack of nausea, followed shortly by the vomiting of recently ingested food. Since that time he had continued to vomit 'everything' he ate, the vomiting usually occurring about one or two hours after the ingestion of food. His upper abdomen became tender and distended. He was able to pass gas by rectum, but no bowel movements had occurred since his first attack of nausea. The physical examination was unchanged from that above, except that his abdomen was distended and tympanitic, with diffuse tenderness, most marked in the epigastrium. Peristalsis gave a high-pitched note and was not heard except at infrequent intervals.

The blood showed a white-cell count of 8500. The serum chlorides were equivalent to 95 cc of N/10 sodium chloride per 100 cc, and the serum protein was 6.6 gm per 100 cc. A flat x-ray film of the abdomen showed several air filled dilated loops of small intestine, visible particularly in the right lower abdomen. The colon was air filled but not distended. With Wangenstein drainage, enemas, parenteral fluids and a blood transfusion the patient improved. About twelve days after admission an exploratory laparotomy was performed.

DIFFERENTIAL DIAGNOSIS

DR CLAUDE E. WELCH May I see the x-ray films?

DR. AUBREY O. HALSTON The filling defect described in the lower third of the stomach on the greater curvature is quite obvious in these films. It does appear to be extraluminal, but you can rarely be quite sure that a tumor is submucosal because the mucosa is stretched over the lesion so tight that one cannot always recognize it. So far as I can say, this one is very likely to be submucosal. It does not look like a polyp. It is a sessile appearing intramural defect. The mucosa around it is absolutely normal. The film taken on the second admission does show signs of small-bowel ileus or obstruction. The colon contains gas, and so does the stomach. The small bowel is enormously dilated. There is also some dense substance that looks like bismuth in the colon. I do not believe there is evidence of obstruction in the colon.

DR. WELCH So the initial diagnosis is easy. It is quite obvious that we are dealing with a tumor of the stomach plus superimposed intestinal obstruction. From this point on we progress on rather thin ice because quite a number of probabilities and possibilities have to be discussed.

Is there anything in the past history that would be of any advantage in this discussion? I expect

that his two previous attacks of pain were due to a lesion that will be discovered in the bowel rather than to the one in the stomach. We can obviously rule out the diagnosis of ulcer, and I think we had better regard the tarry stool with a good deal of suspicion because it is not confirmed by any other test. At the time of admission, in the emergency ward, we have no data of interest except for the x-ray examination. The commonest lesion in the stomach in that location is a leiomyoma or possibly a leiomyosarcoma. Two other things to be considered are neurofibroma, which occasionally occurs within the wall, and pancreatic rest, although the mass is large for the latter. We should also consider polyp, which I think we can rule out by the x-ray picture. Carcinoma, if we can trust the x-ray report, which is usually the most accurate part of the record, we can rule out. The possibility of lymphoma remains and must be seriously considered. The picture, of course, is unusual for that of lymphoma in that the tumor is well localized without induration of the wall surrounding it, on the other hand, a submucosal lymphoma must be kept in mind.

Apparently this disease had been progressive or he had developed some other disease when he came in with intestinal obstruction. The stomach tumor may have been an entirely different lesion from the one that was producing intestinal obstruction, on the other hand, the two may be related.

Let us proceed then with a diagnosis of intestinal obstruction and see if we can rule in a diagnosis that might coincide. In the first place, the obstruction of the small bowel, judging from the amount of gas-filled intestines we see, was probably low in the ileum, furthermore it was not a complete obstruction, for there is gas in the colon and gas was passed quite freely by rectum. I do not believe we have any evidence to indicate that this was a paralytic ileus, because peristalsis persisted and he had a white-cell count of 8500 and, I assume, a normal temperature. In other words there was a mechanical obstruction of some type.

If we consider the causes of mechanical intestinal obstruction we can rule out several of them immediately. The commonest, of course, is hernia. There was no evidence externally, and internal hernias are so rare we can drop them from our discussion. Could it have been a foreign body of some type, a food bolus or a gallstone? The previous attacks of abdominal pain would make one consider gallstone. On the other hand, about half the gallstones that obstruct the small bowel are visible on flat plates of the abdomen. We see no area of density here. Furthermore, the patient lived for twelve days and apparently improved.

That would be highly improbable with gallstone obstruction, which usually progresses rapidly to lethal exitus unless the stone is removed. Could it have been volvulus? The patient was alive twelve days afterward, volvulus would undoubtedly by that time have led to infarction and peritonitis. The attack was not typical of intussusception in any respect. A mesenteric thrombosis seems to be ruled out by the normal white count, by the blood pressure and by other features that are not typical.

So we are left with two types of obstruction that we need to consider seriously. One is that due to bands or adhesions of some type and the other is that due to tumor. Obstructions due to adhesions usually follow abdominal operations. This man had not had a previous operation. He conceivably could have had congenital adhesions or some band arising around the base of a Meckel's diverticulum. But we have no positive evidence to lead to that diagnosis. What kind of tumors would produce such an obstruction? If this was in the lower ileum, the commonest tumors we have to deal with are lymphoma, leiomyoma, fibroma, carcinoma and carcinoids. Of that entire group lymphoma is the commonest. The fact that lymphoma is frequently a multiple tumor and the fact that there was also a tumor in the stomach incline us somewhat toward that diagnosis. Leiomyomas frequently produce gross intestinal bleeding, a symptom for which we have no evidence. Again, if I am going to make one diagnosis cover both lesions, it is unusual to have two leiomyomas in the same patient. Fibroma of the lower bowel rarely attains sufficient size to produce intestinal obstruction. Primary carcinoma of the lower ileum is possible but is not so common as it is in the jejunum or duodenum. A carcinoid is a rare tumor which is frequently multiple, but it is extremely rare in the stomach. So it is with a great deal of trepidation that I come down to a final diagnosis that will cover all the difficulties in this patient. I have ruled out all the common things such as carcinoma of the stomach, with metastases, bands and adhesions, and I should say that we are dealing with multiple tumors, which, on the law of chance, will prove to be lymphomatous.

DR. RICHARD H. WALLACE. This man had two extremely unusual and entirely unrelated findings. The first operation was done for small-bowel obstruction, the nature of which we did not know. The point of obstruction was in the pelvis. The whole abdomen was filled with not only greatly dilated but greatly thickened loops of small bowel, such as are found in cases with chronic obstruc-

tion The terminal ileum was entirely collapsed The obstruction was produced by a large Meckel's diverticulum which contained about 300 cc. of liquid fecal material and was distended to the thinness of a rubber balloon There was no evidence of inflammation, and no adhesions The diverticulum was entirely free, with no twist or impairment of blood supply, and in lifting the tip all the fluid very readily ran back into the bowel

This is especially interesting to me because in 1933 Dr Richard H Miller and I* looked up all the cases of Meckel's diverticulum in this hospital, and of the cases that had symptoms over 85 per cent had obstruction and of all the latter there was not a single case with a non-inflammatory or non-adherent diverticulum

We removed the diverticulum, then felt the pyloric end of the stomach which seemed very much as described by x ray, there being a 2.5-cm rubbery smooth mass, which seemed to be in the wall of the stomach We thought it was probably a leiomyoma and felt that it ought to be removed Approximately three weeks later we re-explored the patient and did a subtotal resection

CLINICAL DIAGNOSES (PREOPERATIVE)

Small-bowel obstruction
Leiomyoma of stomach

DR. WELCH'S DIAGNOSIS

Malignant lymphoma of stomach and ileum

*Miller R. H., and Wallace R. H.: Meckel's diverticulum I. acute abdominal emergencies. *A. S. S. S.* 96:713-721 1933

ANATOMICAL DIAGNOSES

Meckel's diverticulum, with intestinal obstruction.

Ectopic pancreas (adenomyoma) of stomach

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY When the resected portion of the stomach was examined it was apparent that the mucosa had been elevated over a considerable area by an underlying intramural tumor The mucosa itself was normal except for a small but clearly visible dimple overlying the central part of the tumor On section it was evident that the tumor was circumscribed but not encapsulated and involved submucosa, muscularis and even serosa On microscopical examination it was found to consist of irregularly intertwining bundles of muscle fibers surrounding small groups of epithelial cells Most of these consisted of ducts or glands lined with high columnar, mucous-secreting epithelium similar to that seen in the ducts of the pancreas One area contained recognizable gastric epithelium with clearly apparent chief cells No pancreatic acinar cells were found, but in the depths of the tumor were several characteristic islands of Langerhans, so the pancreatic nature of the rest appears established beyond doubt.

These are the tumors which have often, in the past, been described as adenomyomas Occasionally only the rather non-specific ducts are present, but usually some other pancreatic elements can be identified if enough sections are cut. The inclusion of functioning gastric epithelium is, in my experience, quite unusual

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PROBLEMS BEFORE THE MEDICAL PROFESSION

THE development of medical knowledge, technology and material appurtenances during relatively recent years could hardly have been expected to occur without resulting in many changes in the practice of medicine. A similar development has occurred in other fields of human endeavor where advances in science have resulted in increased effectiveness. These developments not only have provided new implements, new methods and new products but also have effectively changed industrial and commercial organization and social and political economy.

One sees in retrospect the growth of scientific knowledge as the progress of man's control over natural forces, the development of his environment, and the acquisition of an independence from supernatural and traditional authority. In the Renaissance

there were the voyages of the great explorers, the flowering of art and commerce, the Protestant Reformation. Vast countries were opened up, industrial revolution occurred, national dependency declined. In this environment the seeds of democracy germinated, and democracy flowered best in America where the opportunity for expansion provided the ideal conditions for the social expression of individual equality and independence. Later when the frontier had gone and America came of age, followed a period of consolidation and organization, a supplementation by mechanization, instrumentation of the no longer expansive graphic environment. New advances in technology still contributed to man's control over natural forces, to bigger and better tools and products but they entailed a dependence of man on himself on the ever-increasing instruments of production. The economic independence of the individual declined. And in so far as has occurred, the democracy of individuality which developed as the social expression of individual equality and opportunity, no longer reflects the social demands. Trusts and corporations grow to provide the machinery of production. Unions and co-operatives develop to protect the interests of the individuals. Society takes a form and government a function that limit the rights of individuals.

Medicine has not and probably cannot escape this general trend. It is faced with problems of consolidation and organization. As medicine and practice have developed, the equality and independence of physicians have been lost as witnessed, for example, by the prevalence of so-called "closed staffs." And just as individuals in other walks of life have created organizations to cope with the increasing intricacies of their occupations, so physicians have developed medical societies, clinics, group practices and specialties. And, paradoxically enough, these attempts to solve the problems which have threatened the independence and individuality of physicians have in many ways infringed upon them. But the clock cannot be turned

Neither will it avail to stand aside pointing to the record of the past, while society, intent on its struggle with the present, moves on

If the medical profession is to direct its future course, it must face reality. And in so doing, it is well to remember that the present problems concerning the distribution of costs and organization of medical service arise from the very developments that have contributed to the advance of medicine in the past. Unless these problems are considered with a tolerance and judgment which are consistent with constructive action toward their solution, further advances may be impeded. For, if the consideration becomes a contention of prejudice and emotion, little progress will be made, much harm may be done, and the problems will remain

COMMUNITY FUND CAMPAIGN

As this issue of the *Journal* goes to press, the success of the 1940 Community Fund Campaign is being shaped by Greater Boston's people. A minimum of \$4,625,000 must be reached by February 6

At the end of the first day, the Physicians Group showed a 17 per cent increase over its contribution of last year, thus doing a fine job toward making this year's campaign the biggest ever. Each physician should have a genuine sense of personal responsibility for the success of the Fund. Only in this way can the goal be attained, and the Community Fund must succeed, since it is vital to the well-being of the people of Greater Boston

MEDICAL EPONYM

BABINSKI'S PHENOMENON

Joseph Babinski (1857-1932) described this sign in the *Comptes rendus hebdomadaires des séances et mémoires de la Société de biologie* (48 207, 1896). The title of the article is *Sur le réflexe cutané plantaire dans certaines affections organiques du système nerveux central* [Plantar cutaneous reflex in certain organic affections of the central nervous system]. The translation of a portion of the article is as follows

I have observed in a certain number of cases of hemiplegia or monoplegia involving the leg which were associated with an organic affection of the central

nervous system, a disturbance in the plantar reflex of which I here present a short description. On the healthy side, pricking of the sole of the foot causes a flexion of the thigh on the pelvis, the leg on the thigh, the foot on the leg, and the great toe on the metatarsus. This also occurs in normal persons. On the paralyzed side, a similar stimulus also gives rise to a flexion of the thigh on the pelvis, the leg on the thigh, the foot on the leg, but the great toe instead of being flexed is extended on the metatarsus

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

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PUERPERAL INFECTION FOLLOWING NORMAL DELIVERY

Mrs. F. H., a twenty-eight year-old woman, on the morning of August 12, 1936, five days after a normal delivery of her second baby had had a chill, followed by a temperature of 103°F and a pulse of 120

The family history was irrelevant. The patient's past history was negative except for a tonsillectomy. Catamenia began at twelve and had ever been regular until her marriage. Her last period had begun on November 2, 1935, making her expected date of confinement August 9. The previous pregnancy had ended in a normal delivery on July 1, 1935 but the baby lived only six weeks.

The recent pregnancy had been normal throughout. She was delivered normally of an 8 pound, 12 ounce, female child after median episiotomy. The placenta and membranes were delivered intact and there was no bleeding after delivery.

Convalescence was normal until the fifth post partum day, as stated above. Examination at that time showed the uterus not enlarged. There was an indefinite deep mass in the left breast. The lochia was sticky and dark, and a stained smear showed gram positive cocci in chains and gram negative bacilli; a culture yielded hemolytic streptococci and colon bacilli. That afternoon the temperature came down to 100.4°F and then went up to 104. On August 13 the morning temperature was 102.8°F, in the afternoon it rose to 102 with a pulse of 120. The next day the temperature was normal and remained so throughout the rest of the hospital stay. Because of the short duration of the temperature, conservative treatment was instituted. The baby did not nurse.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

Comment The sudden rise in temperature five days post partum, while unusual in puerperal infection, is not uncommon. The source of the infection was discovered by bacteriological examination. At the onset of the fever there was an indefinite lump in one breast which might have led one to think that the breast was responsible. However, for a temperature of 104°F on the fifth day following delivery to be caused by a breast infection is most unusual. The uterus was normal in size, it was not tender. There was no tenderness in the abdomen. The lochia was not normal, it was sticky and dark-colored, and the smear and culture showed the infective agents. The treatment was entirely conservative so far as the uterus itself was concerned. Ice was applied to the fundus, and Ergotrate was given by mouth. Consultation with a bacteriologist was held, the question of administering sulfanilamide was gone into, but the short duration of the clinical symptoms seemed to make this unnecessary. The patient has since had another baby, with a perfectly normal convalescence.

DEATHS

BRIGHAM—FRED C. BRIGHAM, M.D., of Springfield, died January 22. He was in his seventieth year.

Born at Fayston, Vermont, he attended Green Mountain Seminary at Waterbury, Vermont, and the State Normal School at Randolph. He received his degree from Baltimore Medical College in 1898, and started practice in Salisbury and Jamaica, Vermont. Before going to Springfield he practiced in Westfield.

He was a member of the Massachusetts Medical Society, the American Medical Association, the Springfield Academy of Medicine, the Hampden County Medical Association, the Eastern Hampden Medical Society and the New England Society of Physical Medicine. Dr. Brigham retired from active practice in 1934.

His widow, two daughters and a sister survive him.

BURNHAM—J. FORREST BURNHAM, M.D., of Lawrence, died January 26. He was in his seventy-second year.

Dr. Burnham attended Harvard University and received his degree from the Harvard Medical School in 1901. He was a fellow of the Massachusetts Medical Society and the American Medical Association. From 1914 to 1920 he was an alternate delegate and from 1920 to 1936 a delegate to the House of Delegates of the American Medical Association, and he had served as secretary of the Essex North District Medical Society. Dr. Burnham was secretary of the staff of the Lawrence General Hospital for many years and was a member of the Lawrence Medical Club.

His widow survives him.

PREBLE—WILLIAM E. PREBLE, M.D., of Boston, died January 22. He was in his sixty-fifth year.

Born in Litchfield, Maine, he attended Bowdoin College and received his degree, cum laude, from Harvard Medical School in 1909. In 1925 he received an honorary degree from Bowdoin College.

Dr. Preble was a former instructor at Tufts College Medical School and had served as head of the medical department at the Boston Dispensary. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow and a daughter survive him.

STIVERS—GEORGE L. STIVERS, M.D., of Tucson, Arizona, died November 26, 1939. He was in his sixty-third year.

Dr. Stivers received his degree from the Long Island College of Medicine in 1899. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

MISCELLANY

MOTOR-VEHICLE DEATHS FOR 1939

Motor vehicle deaths in one hundred and fifty-one major cities decreased 4 per cent in 1939 from the previous year, however a decrease of 10 per cent was reported for the first six months, according to reports made public recently by Director William L. Austin, Bureau of the Census, Department of Commerce. Deaths for 1939 totaled 8009, compared with 8376 for 1938, a decrease of 367. These percentage decreases are based on provisional figures for 1939 and 1938.

Considering only those deaths in each city due to motor vehicle accidents occurring within the city limits, the 1939 reports showed a total of 5641 deaths. This figure is a decrease of 222 deaths, or 3.8 per cent, from the 5863 deaths reported for the same cities in 1938. The decrease in the total is reflected in the individual cities, eighty-one of which showed a decrease in the number of deaths from 1938, sixty-two showed increases, and eight cities had the same number.

Six of the cities having populations of 500,000 or more and showing decreases in the number of deaths occurring within the city are New York City (2.8 per cent), Los Angeles (7.6 per cent), Cleveland (16.6 per cent), St. Louis (26.6 per cent), Boston (5.6 per cent), and Pittsburgh (8.5 per cent). Seven cities having similar populations and showing increases over the 1938 figures are Chicago (0.5 per cent), Detroit (5.5 per cent), Baltimore (8.8 per cent), San Francisco (14.0 per cent), Milwaukee (26.8 per cent), Buffalo (1.2 per cent), and Washington (7.5 per cent).

CORRESPONDENCE

LICENSE REVOKED

To the Editor The license of Dr. Simeon Weiner, 167 Pleasant Street, Worcester, was revoked by the Board of Registration in Medicine on January 18, because of participation in the production of premature termination of pregnancy.

STEPHEN RUSHMORE, M.D., *Secretary*.

State House,
Boston

FEDERAL INSURANCE BENEFITS FOR SURVIVORS

To the Editor No one is more familiar with the family problems caused by death than the doctor in whose care the family has entrusted its well-being. Beyond the sorrow and personal bereavement, the doctor is only too

painfully aware of the economic problems which the death of a breadwinner may bring to a family. Yet, in many cases, he is powerless to assist when more than his own medical services are needed.

The new provisions of Federal Old Age and Survivors Insurance, effective January 1, 1940 may have an abiding interest for doctors as a means of eliminating, or at least reducing substantially, the economic misfortunes occasioned, in many cases, by death. A brief summary of those provisions which might be of special interest to the general family practitioner follows.

New survivors benefits are payable on the death of an insured wage earner after December 31 1939. In contrast with the old-age payments after the age of sixty five, survivors benefits are payable without regard to the age of the deceased. In all cases, the person on whose wages the benefits are based must have been a wage earner in business or industry after 1936 and must meet the eligibility requirements. Detailed information of these requirements may be obtained from any of the forty-four field offices of the Social Security Board located in the principal cities of New England.

The kinds of survivors benefits are as follows:

- (1) Monthly cash benefits for insured wage earner's widow after the age of sixty-five, until she remarries or dies.
- (2) Monthly cash benefits for insured wage earner's widow regardless of age, while she has in her care the deceased's unmarried dependent children under the age of sixteen or under the age of eighteen if still attending school.
- (3) Monthly cash benefits for insured wage earner's unmarried dependent child or children under the age of sixteen, or under the age of eighteen if still attending school.
- (4) Monthly cash benefits for insured wage earner's dependent parents, after the age of sixty-five if no widow or child under the age of eighteen, survivors.
- (5) Lump sum if insured wage earner leaves no survivors immediately entitled to monthly benefits.

The following table gives examples of survivors' monthly benefits according to wage, years of coverage and number of dependents.

| AVERAGE MONTHLY WAGE OF DECLASSED WORKER | ONE CHILD, OR PARENT 65 OR OVER | WIDOW 65 OR OVER | WIDOW AND ONE CHILD |
|--|---------------------------------|------------------|---------------------|
| WITH 3 YEARS OF COVERAGE | | | |
| \$50 | \$10.30 | \$15.45 | \$25.75 |
| 100 | 12.87 | 19.31 | 32.18 |
| 150 | 15.45 | 23.17 | 38.62 |
| 250 | 20.60 | 30.90 | 51.50 |
| WITH 5 YEARS OF COVERAGE | | | |
| \$50 | \$10.50 | \$15.75 | \$26.25 |
| 100 | 13.12 | 19.69 | 32.81 |
| 150 | 15.75 | 23.62 | 39.37 |
| 250 | 21.00 | 31.50 | 52.50 |
| WITH 10 YEARS OF COVERAGE | | | |
| \$50 | \$11.00 | \$16.50 | \$27.50 |
| 100 | 13.75 | 20.60 | 34.37 |
| 150 | 16.50 | 24.75 | 41.25 |
| 250 | 22.00 | 33.00 | 55.00 |

Complete information on this subject may be obtained by directing the inquiry to the Social Security Board Field Office at the nearest of the following locations:

Connecticut—Bridgeport, Hartford, Meriden, New Britain, New Haven, New London, Stamford, Torrington, Waterbury and Willimantic.

Maine—Augusta, Bangor, Lewiston and Portland.

Massachusetts—Attleboro, Boston (120 Boylston Street or 40 Central Street), Brockton, Cambridge,

Chelsea, Dorchester, Fall River, Fitchburg, Haverhill, Holyoke, Lawrence, Lowell, Lynn, Malden, New Bedford, Pittsfield, Quincy, Salem, Springfield, Waltham and Worcester.

New Hampshire—Concord, Littleton, Manchester, Nashua and Portsmouth.

Rhode Island—Newport, Pawtucket, Providence and Woonsocket.

Vermont—Burlington, Montpelier and Rutland.

JOHN PEARSON, *New England Regional Director*
Social Security Board.

TESTS FOR SYPHILIS DURING PREGNANCY

To the Editor: A considerable number of physicians have inquired of this department as to how they should proceed under the law requiring serological tests for syphilis in pregnancy when the patient refuses to permit a specimen of blood to be taken.

Obviously no physician can compel a patient to permit the specimen to be taken or take it forcibly without being liable to suit for assault. On the other hand, the law directs the physician to take the specimen but does not compel the patient to permit it to be taken. We have advised those physicians who have inquired as follows:

(1) If the physician desires to continue to care for the patient, he may request that she give him a statement in writing to the effect that she refuses to have the specimen taken and accepts personal responsibility for any accident to her pregnancy or the infection of her infant with syphilis which may result from failure to have the blood test done.

(2) If the physician would rather not assume any responsibility in the matter, he may inform the patient that she had better seek medical care elsewhere. It might be well to confirm that advice to the patient in writing.

Unless the physician protects himself through some such means as this, it is conceivable that he might be sued for failure to take the test if the patient produces a syphilitic child or has an accident to her pregnancy on the basis of her infection with syphilis.

N. A. NELSON, M.D., *Director*
Division of Genitoinfectious Diseases,
Massachusetts Department of Public Health.

State House,
Boston.

TYPHOID VACCINE

To the Editor: Typhoid vaccine (monovalent) instead of typhoid-paratyphoid B vaccine, will be distributed routinely by the Department of Public Health after March 1 1940. This is in accordance with the action of the Public Health Council, which action was prompted by the low incidence of paratyphoid B fever. The monovalent typhoid vaccine should cause fewer reactions than the bivalent and should fulfill the chief purpose of immunization against enteric fever.

For a time at least, the typhoid-paratyphoid B vaccine will be available on special request, but will not be sent otherwise.

PAUL J. JAKMAUTH, M.D.
Commissioner of Public Health

State House,
Boston.

UNITED STATES PHARMACOPOEIAL CONVENTION

To the Editor The public scientific conferences will be held simultaneously at the Willard Hotel, Washington, District of Columbia, during the afternoon and evening of Monday, May 13, the day preceding the opening of the 1940 Pharmacopoeial Convention. The programs are being developed under the direction of the General Chairman of the Committee of Revision aided by the chairmen of subcommittees and advisory boards and will be presided over by the subcommittee and advisory board chairmen.

All who are interested in perfecting the pharmacopoeial monographs are invited to take part in these advance conferences. The greatly increased importance of the scope and the standards of the *Pharmacopoeia* to medicine and surgery, to pharmacy in all its divisions, and to the enforcement officials of the federal and state governments calls for the widest collaboration from those who are interested in pharmacopoeial standards.

Those who can participate in this program should write to the specific subcommittee or board chairman responsible for the subjects in which they are interested. The chairmen are listed in the *Pharmacopoeia*. If preferred, the subject to be presented may be sent directly to the General Chairman of the Committee of Revision, and the chairman of the particular conference covering the subject will be immediately notified.

E FULLERTON COOK, *General Chairman*,
U S P XI, Committee of Revision

43rd Street and Woodland Avenue,
Philadelphia

NOTICES

BOSTON DOCTORS SYMPHONY ORCHESTRA



The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concertmaster with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every

Thursday at 8 30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, February 20, at 12 o'clock noon. Dr Edward A Edwards will speak on "The Common Diseases of the Veins".

Physicians are cordially invited to attend.

TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10 00 to 12 30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium of high voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report

will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

BOSTON LYING IN HOSPITAL

The Journal Club will hold a meeting at the Boston Lying in Hospital on Tuesday evening, February 13, at 8 15. Dr W E Caldwell will speak, his subject being "The Obstetric Pelvis".

JOSEPH H PRATT DIAGNOSTIC HOSPITAL

The following talks will be given in the auditorium of the Joseph H. Pratt Diagnostic Hospital during the week of February 4.

Monday, February 5, at 4 30 p.m. Cancer of the Stomach. Dr George Pack, of the Memorial Hospital, New York City.
Discussion by Dr Howard M Clute.

Thursday, February 8, at 4 30 p.m. Tumors of the Bone. Dr Bradley Coley, of the Memorial Hospital, New York City.
Discussion by Dr Channing C Simmons.

Reticulum-cell Sarcoma of Bone. Dr Channing C. Simmons.

Physicians are cordially invited to attend these lectures.

JOSEPH H PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9-10 a.m.

MEDICAL CONFERENCES

Friday, February 2—The Diagnosis of Multiple Myeloma. Dr B M Jacobson.

Saturday, February 3—Hospital case presentation. Dr Thannhauser.

Tuesday, February 6—Skin Cancer. Dr F M Thurmon.

Wednesday, February 7—Hospital case presentation. Dr Thannhauser.

Thursday, February 8—Gynecological Cancer. Dr L. E. Phaneuf.

Friday, February 9—Hodgkin's Disease. Drs. William Dameshek and Isadore Olef.

Saturday, February 10—Intrathoracic Cancer. Drs R. H. Overholt and R H Betts.

Tuesday, February 13—Hospital case presentation. Dr Thannhauser.

Wednesday, February 14—Clinicopathological conference. Dr C S Keefer.

Thursday, February 15—Title to be announced. Dr A A Thibodeau.

Friday, February 16—Some Observations on Pituitary Adenomas. Dr M C Sosman.

Saturday, February 17—Hospital case presentation. Dr Thannhauser.

Tuesday, February 20—Paralysis Agitans. Dr H. I Harris.

Wednesday, February 21—Hospital case presentation. Dr Thannhauser.

Friday, February 23—Epidemiology of Respiratory Infections. Dr Dwight O'Hara.

Saturday, February 24—Hospital case presentation. Dr Thannhauser.

Tuesday, February 27—Suppurative Disease of the Lungs. Dr L. F Davenport.

Wednesday, February 28—Hospital case presentation. Dr Thannhauser.

Thursday February 29—The Medical Social and Preventive Aspects of a Selected Case. Preceptors and medical students.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday February 7 from 2 to 4 p.m. Drs. Robert Zollinger and William P. Murphy will speak on "Menorrhagia." A clinicopathological conference conducted by Dr. Elliott C. Cutler will take place from 4 to 5 p.m.

On Thursday February 8, from 8.30 to 9.30 a.m. there will be at the Peter Bent Brigham Hospital, a combined clinic, conducted by Dr. Charles A. Janeway of the medical, surgical, orthopedic, and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Physicians and students are cordially invited to attend.

WILLIAM HARVEY SOCIETY

A meeting of the William Harvey Society of Tufts College Medical School will be held in the auditorium of the Beth Israel Hospital Boston on Friday evening February 9 at 8.00. Dr. Albert N. Richards will speak on "Kidney Function." The meeting will be conducted by Dr. David Rapport.

Interested members of the medical profession and their friends are invited to attend.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday evening February 6, at 8.15. Clinical papers will be presented by members of the staff of the New England Medical Center.

PROGRAM

- Group Psychotherapy Dr. Herbert I. Hartis.
 Carcinoma of the Rectum. Dr. William M. Shedden.
 Hyperlipemia. Dr. S. J. Thanhauser.
 Anorexia Nervosa or Hypopituitarism? Dr. Samuel Proger.
 "What We Can and Cannot Do in Allergy" Dr. Ethan A. Brown.

NEW ENGLAND DERMATOLOGICAL SOCIETY

The next meeting of the New England Dermatological Society will be held on Wednesday February 14 at 2.00 p.m. at the Massachusetts General Hospital. There will be a dinner following the meeting.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea will be held at "The Hut," on Wednesday afternoon, February 7, at 4.00 p.m. Dr. Henry D. Chadwick will talk, his subject being "Epidemiology of Tuberculosis."

UNIVERSITY EXTENSION COURSES

To help prepare young people for work as medical secretaries and to assist dental hygienists in learning up-to-the-minute information on health education, the Massachusetts Department of Education has scheduled two university-extension courses, namely "Training for Doc-

tors Secretaries" and Public Health Education for Dental Hygienists."

The secretarial course consisting of eight lectures, will be given by Dr. Robert M. Green, associate professor of applied anatomy at Harvard Medical School. In these lectures Dr. Green will consider the following basic medical sciences: anatomy, hygiene, physiology, pathology, pharmacology, dietetics and nutrition. The class will meet on Tuesdays, at 7.30 p.m. starting February 6 in Sever Hall Harvard University Cambridge.

The course on health education will consist of fifteen lectures and will be given by Miss Jean V. Latimer, coordinator of health education, Division of Child Hygiene, Massachusetts Department of Public Health and instructor in health education, Hyannis State Teachers College (summer session) and by Dr. Florence B. Hopkins, dental pediatrician, Massachusetts Department of Public Health. The course will be held at the Forsyth Dental Infirmary for Children, 140 Fenway Boston, beginning Friday February 9 at 7.15 p.m.

Registration may be made at the first meeting of each class or to insure enrollment, at the office of the Division of University Extension, State Education Building, 200 Newbury Street, Boston.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The next annual meeting of the American Association for the Study of Goiter will be held at Rochester, Minnesota April 15, 16 and 17. The program for the three-day meeting will consist of papers dealing with goiter and other diseases of the thyroid gland, dry clinics conducted by guests of the association, and operative clinics conducted by the staff of the Mayo Clinic.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY FEBRUARY 4

- SA. Y. FEBRUARY 4
 4 p.m. Facts and Fancies About Heart Disease. Dr. Paul D. White. Free public lecture. Harvard Medical School, amphitheater of Building D.
 4 p.m. Heart Disease. Dr. Barton E. Hamilton. Illustrated, public, health lecture. Fulkner Hospital auditorium.

- MONDAY FEBRUARY 5
 12.15-1.15 p.m. Clinicopathological conference. Dr. S. Burt Wolbach, Peter Bent Brigham Hospital amphitheater.
 4 p.m. Physics and medical students are cordially invited to attend a clinic presented by the medical, surgical and orthopedic services of the Infants and Children's Hospitals in the amphitheater of the Children's Hospital.
 4.30 p.m. Cancer of the Stomach. Dr. George Pack. Joseph H. Pratt Diagnostic Hospital.

- TUESDAY FEBRUARY 6
 9-10 a.m. Skin Cancer. Dr. Francis M. Thurman. Joseph H. Pratt Diagnostic Hospital.
 10 a.m.-12.30 p.m. Boston Dispensary tumor clinic.
 12.15-1.15 p.m. X-ray conference. Dr. Merrill C. Souman. Peter Bent Brigham Hospital amphitheater.
 8.15 p.m. Greater Boston Medical Society. Beth Israel Hospital auditorium.

- WEDNESDAY FEBRUARY 7
 New England Pediatric Society. Children's Hospital amphitheater and Longwood Towers.
 9-10 a.m. Hospital case presentation. Dr. S. J. Thanhauser. Joseph H. Pratt Diagnostic Hospital.
 12 m. Clinicopathological conference. Children's Hospital amphitheater.
 4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.

- THURSDAY FEBRUARY 8
 8.30-9.30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital and the Peter Bent Brigham Hospital.

- *9-10 a.m. Gynecological Cancer Dr Louis E. Phaneuf Joseph H Pratt Diagnostic Hospital
 *4 30 p.m. Tumors of the Bone Dr Bradley Coley Joseph H Pratt Diagnostic Hospital

FRIDAY FEBRUARY 9

- *9-10 a.m. Hodgkin's Disease. Drs William Dameshek and Isadore Olef Joseph H Pratt Diagnostic Hospital
 *10 a.m.-12 30 p.m. Boston Dispensary tumor clinic
 *8 p.m. William Harvey Society Beth Israel Hospital auditorium

SATURDAY FEBRUARY 10

- *9-10 a.m. Intrathoracic Cancer Drs Richard H Overholt and Reece H Betts Joseph H Pratt Diagnostic Hospital
 *10 a.m.-12 m. Medical staff rounds of the Peter Bent Brigham Hospital Conducted by Dr C Sidney Burwell

*Open to the medical profession

FEBRUARY 2 — Staff meeting United States Marine Hospital Page 165 issue of January 25

FEBRUARY 2-29 — Joseph H Pratt Diagnostic Hospital medical conferences Page 202

FEBRUARY 4 — Free public lecture Harvard Medical School Page 1042 issue of December 28

FEBRUARY 4 — Public lecture Salem Hospital Page 1042 issue of December 28

FEBRUARY 4 — Free public lecture. Quincy City Hospital Page 77 issue of January 11

FEBRUARY 4 — Illustrated public health lectures Faulkner Hospital Page 164 issue of January 25

FEBRUARY 5 — Cancer of the Stomach Dr George Pack Joseph H Pratt Diagnostic Hospital Page 202

FEBRUARY 6 — Greater Boston Medical Society Page 203

FEBRUARY 7 — New England Pediatric Society Page 164 issue of January 25

FEBRUARY 7 — Wachusett Medical Improvement Society Page 164 issue of January 25

FEBRUARY 7 — Staff meeting United States Marine Hospital Page 203

FEBRUARY 7 — Joint medical and surgical clinic Peter Bent Brigham Hospital Page 203

FEBRUARY 8 — Combined clinic of the medical surgical orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital Page 203

FEBRUARY 8 — Tumors of the Bone. Dr Bradley Coley Joseph H Pratt Diagnostic Hospital Page 202

FEBRUARY 8 — Pentucket Association of Physicians 8 30 p.m. Hotel Barlett Haverhill

FEBRUARY 9 — William Harvey Society Page 203

FEBRUARY 11-14 — International College of Surgeons Page 759 issue of November 9

FEBRUARY 13 — Boston Lying in Hospital Journal Club Page 202

FEBRUARY 14 — New England Dermatological Society Page 203

FEBRUARY 20 — South End Medical Club Page 202

FEBRUARY 22-24 — American Orthopsychiatric Association Page 957 issue of December 14

MARCH 2 JUNE 8 and 10 — American Board of Ophthalmology Page 719 issue of November 2

MARCH 7-9 — The New England Hospital Association Hotel Statler Boston

APRIL 15-17 — American Association for the Study of Gout Page 203

APRIL 24-26 — Scientific Session Academy of Physical Medicine Hotel John Marshall Richmond Virginia

MAY 10-18 — American Scientific Congress Page 1043 issue of December 28

MAY 13 — United States Pharmacopoeial Convention Page 202

JUNE 7-9 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15

MIDDLESEX NORTH

APRIL 24

JULY 31

OCTOBER 30

NORFOLK SOUTH

MARCH 7

APRIL 4

MAY 2

All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon

PLYMOUTH

MARCH 21 — Goddard Hospital Brockton

APRIL 18 — State Farm

MAY 16 — Lakeville Sanatorium Lakeville

SUFFOLK

MARCH 27 — Scientific meeting Symposium on Ulcerative Colitis and Diarrheas. Under the direction of Dr Chester M Jones

APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

WORCESTER

FEBRUARY 14 — Worcester State Hospital

MARCH 13 — Worcester Memorial Hospital

APRIL 10 — Worcester Hahnemann Hospital

MAY 8 — Worcester Country Club

Each meeting begins with a dinner at 6 30 p.m. and is followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

Manual of Public Health Nursing Prepared by the National Organization for Public Health Nursing Third edition 529 pp New York The Macmillan Co, 1939 \$2.50

A True History of the Terrible Epidemic Vulgarly Called the Throat Distemper which Occurred in His Majesty's New England Colonies between the Years 1735 and 1740 Ernest Caulfield 113 pp New Haven Yale Journal of Biology and Medicine, 1939 \$2.50

Hereditary and Environmental Factors in the Causation of Manic-Depressive Psychoses and Dementia Praecox Horatio M Pollock, Benjamin Malzberg and Raymond G Fuller 473 pp New York State Hospitals Press, 1939 \$2.50

Hygiène et cancer P Delore. 52 pp Paris Presses Universitaires de France, 1939 6 Fr fr

Recent Advances in Medical Science A study of their social and economic implications Edward Mellanby 62 pp New York The Macmillan Co, 1939 75 cents

Les perforations digestives de la fièvre typhoïde pronostic, diagnostic et traitement Jacques Dor 134 pp. Paris Masson et Cie, 1939 24 Fr fr

Treatment and What Happened Afterward A study from the Judge Baker Guidance Center William Healy and Augusta F Bronner 54 pp Boston Judge Baker Guidance Center, 1939 50 cents.

Beyond the Clinical Frontiers A psychiatrist views crowd behavior Edward A Strecker 210 pp New York W W Norton & Co, 1940 \$2.00

A Doctor Without a Country Thomas A Lambie. 252 pp New York Fleming H Revell Co, 1939 \$2.00

The Patient's Dilemma The quest for medical security in America Hugh Cabot. 284 pp New York Reynal and Hitchcock, 1940 \$2.50

Virus and Rickettsial Diseases With especial consideration of their public health significance A symposium held at the Harvard School of Public Health June 12 June 17, 1939 907 pp Cambridge, Massachusetts Harvard University Press, 1940 \$6.50

Les hermaphrodites et la chirurgie L. Ombredanne. 322 pp Paris Masson et Cie, 1939 85 Fr fr

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

FEBRUARY 14 — Cough Sputum Hemoptysis — How shall they be investigated? Dr Reece H Betts Essex Sanatorium Middleton

MARCH 6 — Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcus Infections. Dr Champ Lyons Lynn Hospital Lynn

APRIL 3 — Addison Gilbert Hospital Gloucester

MAY 8 — Annual meeting Salem Country Club Peabody

HAMPSHIRE

MARCH 13

MAY 8

Meetings are held at 11 30 a.m. at the Cooley Dickinson Hospital, Northampton

MIDDLESEX EAST

MARCH 20

MAY 15

Meetings are held at 12 15 p.m. at the Unicorn Country Club Stonham

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NUMBER 6

FURTHER STUDIES ON THE TREATMENT OF PEPTIC ULCER WITH ALUMINUM HYDROXIDE GEL*

E. STANLEY EMERY, JR., M.D.,† and ROBERT B. RUTHERFORD, M.D.‡

BOSTON

IT HAS become generally accepted that the neutralizing of gastric acidity is a helpful procedure in the treatment of peptic ulcer. For the average patient, the use of calcium carbonate and sodium bicarbonate, as originally advocated by Sippy, is very satisfactory and has the advantage of being quite inexpensive, but these powders are contraindicated for some patients because of the large intake of sodium. Patients with a lowered renal function may have difficulty in excreting the absorbed alkalis. Those with a tendency to form renal calculi may be made worse, and those who have a hypersecretion may require such large doses that an alkalosis develops before satisfactory control of the gastric acidity is obtained.

When aluminum hydroxide gel became available, it seemed as though this might be a useful addition to our treatment, because it was only slightly absorbed and had a fair neutralizing capacity, and because its astringent action might tend to decrease the secretion of acidity. Starting in the fall of 1937, we began to use aluminum hydroxide gel on a group of patients who were difficult to handle by means of the usual alkalis. By October, 1938, we¹ were able to show that the drug was successful in causing complete neutralization of the gastric juice, and in addition decreased the secretion of hydrochloric acid if given in sufficient amounts. In March, 1939, we² reported the results from treating 28 patients and were able to show that the most severe type of case can be brought under control. Having demonstrated that this drug will temporarily control severe cases, our next problem was to discover whether these patients could be satisfactorily continued on a medical treatment or would ultimately come to surgery. If the latter is true, it will save the patient time and trouble to have the operation performed as soon as possible. This paper deals

with the later course of the 28 patients on whom we have previously reported.

PRESENTATION OF DATA

As previously stated,¹ 16 of these cases represented the severest type of the disease, while 12 were classified as moderately severe. We purposely eliminated the mild cases because they will respond satisfactorily to any good medical or surgical regime. Nine of the patients were observed for only a month. Two of these were started on the treatment in anticipation of surgery, so that we might determine what effect aluminum hydroxide had on the mucous membrane. Two patients who followed the treatment for a month in the hospital failed to return for further observation in the Outdoor Department. Five returned once, were feeling perfectly well at the time and never came back. Four patients were followed for three to five months. They were all feeling well at the time they were last seen, and the gastric analyses showed a lower titration of hydrochloric acid than before starting the treatment.

This leaves 14 patients who were followed for eleven to eighteen months, with an average of fifteen months. Eight of these have had no symptoms and can be considered well. Two are classified as in satisfactory condition, they have had a return of mild symptoms on one or two occasions. The condition of 4 is unsatisfactory, 1 is dead, 1 has had a massive hemorrhage, and 2 have had a return of acute symptoms.

Those patients who fall into the "well" group took aluminum hydroxide every hour throughout the day for four or five months. After this, they were given a regime of milk once between meals and a dose of aluminum hydroxide five or six times a day, so that all have taken a maximum of six doses a day for a minimum of three months. Five cases in this group were originally classified as of the severest type, and 3 were called moderately severe.

*From the Medical Service of the Peter Bent Brigham Hospital, Boston, and the Department of Medicine, Harvard Medical School.

†Instructor in medicine, Harvard Medical School; associate in medicine, Peter Bent Brigham Hospital.

‡Assistant resident physician, Peter Bent Brigham Hospital.

Of the 2 patients who showed satisfactory results, the first had had a subtotal gastrectomy performed for a carcinoma in the pyloric region. He later developed a marginal ulcer and complained of pain, particularly at night. Aluminum hydroxide was allowed to drip into the stomach continuously for one week, following which he took the medicine at hourly intervals throughout the day. Under this regime he was completely free of all symptoms for one month. Since then he has had occasional discomfort at night, which is promptly relieved with a dose of aluminum hydroxide. At no time have his symptoms been so severe as they were before he started on aluminum hydroxide. The second patient was a woman who received the drug hourly for four months. For the next eleven months she took it six times a day, with complete relief until her child became seriously ill with pneumonia. During this period of worry and marked fatigue she stopped taking the medicine, with the result that she suffered a return of some mild symptoms. These were promptly relieved by the resumption of hourly doses of the drug. This case was originally classified as the severest type.

Of the 4 unsatisfactory cases, the first was originally classified as severe. The patient always had difficulty in taking the medicine and was unable to keep the tube down during the day, so that she was started with hourly feedings and the drip method was utilized only during the night. After a week and a half of this therapy her acid dropped from 138 to 95, but she remained on hourly feedings for only three weeks, at the end of which time she went back to the usual calcium and soda powders. A year later she re-entered the hospital with marked symptoms. A gastric analysis at this time gave a free acidity as high as 170. The patient was unwilling to try aluminum hydroxide therapy again. As we were not accomplishing anything with the ordinary alkaline powders, she was transferred to the Surgical Service. A subtotal gastrectomy was performed and she died four days postoperatively.

The second unsatisfactory case was that of a man thirty-five years old, and was classified as severe. A gastrectomy had been performed eleven months previously. A gastrojejunal ulcer developed which was not satisfactorily controlled by the ordinary alkaline therapy, and the patient was placed on aluminum hydroxide. He followed the treatment intensively for seven months, during which time he felt perfectly well. He was then transferred to six doses during the day, but at the end of seven months had a massive hemorrhage. This particular attack of bleeding followed an orgy of beer and scallops. He was then advised to take hourly doses of aluminum hydroxide, but there was some

doubt in our minds as to how thoroughly he followed any regime. At any rate, he admitted not having taken the medicine as instructed, and five months later he had another hemorrhage.

The third case was originally classified as moderately severe, and the patient was completely relieved while taking the drug hourly, which he did for the first five months. He was then transferred to six doses a day and for a period of time continued to be free of symptoms. He then developed a marked mental depression which was associated with a return of the gastric symptoms. In spite of this fact, the free acidity remained considerably lower than it was before the treatment was started. Before treatment was instituted it was 100, and seventeen months later only 52.

The fourth case was originally classified as of the severe type. The patient followed intensive treatment for two months, at the end of which time he felt well. Then for fourteen months he took the treatment in a very haphazard way, paying little attention to any advice which was given him. He was very neurotic and it was difficult to evaluate his complaints. His first gastric analysis showed a free acidity of 100, and one done only six months later was 48.

Of these patients who showed unsatisfactory results, 1 never took proper treatment, 2 were well so long as they followed treatment, and trouble developed only when they did not take reasonable care of themselves, 1 developed symptoms after the onset of a marked mental depression. The gastric acidity has been checked in the 18 cases which were followed for three to eighteen months. In 14 cases it remained lower than before the treatment was started. The average before treatment was 97, but fell to 48 at the time of the last observation.

DISCUSSION

Interest in this group of patients centers around the 14 whom we have been able to follow for an average period of fifteen months. The others have not been observed long enough to permit us to draw any worth-while conclusions. Eight patients followed for the longer period are well, 2 are in a satisfactory condition, and 4 have had unsatisfactory results. The striking fact shown by these figures is the high percentage of well patients in a group which was chosen for the severity of the disease. It is to be expected that better results will be obtained by any form of treatment on patients who are being closely followed. The very fact that the patients are cognizant of the interest being shown in their progress causes them to follow treatment more assiduously than if they were not watched so closely. On the other hand,

it must be remembered that if we had not been interested in determining what could be accomplished by the use of aluminum hydroxide, subtotal gastrectomy would have been advised for all but possibly 3 of these patients. Past experience has taught us that the usual medical treatments accomplish so little with this type of case that surgery will save time and trouble. In this connection, it is interesting that the only patient who completely failed to follow treatment ultimately came to a subtotal gastrectomy and suffered a postoperative death.

It must be emphasized that the use of aluminum hydroxide is only another way of neutralizing gastric acidity, and does not hold out any greater hope for an ultimate cure than do the other methods of antacid therapy. But it is our opinion that aluminum hydroxide is the most effective drug that we have found to date for controlling severe cases during a period of acute activity. It now appears that if special attention is given to these patients, many of them can be carried along satisfactorily on a medical regime, provided they are willing to take five or six doses of the gel a day. Also, it is our present opinion that these patients have done better by continuing on five or six doses of aluminum hydroxide than if they had reverted to the usual calcium and soda powders. This may be due to the aluminum's maintaining the gastric acidity at a lower level than if the patient had taken some other form of alkali. We say this because it is our impression that patients with similarly severe cases who have been treated by the usual alkalis and have been temporarily relieved of their difficulties have not continued to do so well as did this group of patients. However, this is mere speculation, because we are not acquainted with any data which tell us whether the severe type of case, during a period of acute activity, shows an excessively high secretion which will later drop after the acute activity has subsided.

The work of Brown and Dolhart³ suggests that there is no relation between the secretion of hydrochloric acid and the relative activity of the ulcer, but their observations do not specifically cover this type of case.

In view of the observations which we have made to date, we are inclined to give the severe type of case a trial with aluminum hydroxide before advocating subtotal gastrectomy. We say this not only because of these results, but because we have never been so enthusiastic about subtotal gastrectomy as have many other clinicians. There is always great enthusiasm for some new method of therapy, which usually decreases after a sufficient time has elapsed for a proper evaluation of results. As one of us has continuously pointed out, subtotal gastrectomy interferes with the efficiency of digestion and, by and large, patients are better off with their stomachs than without them. Although our clinic has been very conservative about the use of radical surgery, we have already had enough undesirable results to make us believe that this type of therapy should be used only as a last resort.

SUMMARY AND CONCLUSIONS

The results from the use of aluminum hydroxide therapy on 14 cases with peptic ulcer of the severe type are reported.

After these patients had been observed for an average of fifteen months, 8 were found to be well. Two others were getting along satisfactorily, although they had had a temporary return of mild symptoms, and 4 were in an unsatisfactory condition.

These results are considered very gratifying in view of the fact that all these patients were chosen for treatment because of the severity of their disease.

It is suggested that treatment with aluminum hydroxide has a definite place in the medical therapy of peptic ulcer, and that patients should be given the advantage of this therapy before subtotal gastrectomy is advocated.

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OMENTUMECTOMY AS A SAFEGUARD AGAINST THE RECURRENCE OF OMENTAL ADHESIONS*

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PROBABLY the patients who cause more worry to the surgeon and suffer more chronic miseries than do any others are those who have omental, visceral, parietal or pelvic peritoneal adhesions which have been caused by peritoneal injuries

It has been my custom in cases where no acute infection was present and the omentum was found adherent to the pelvic organs, to free the omentum and remove enough of it so that the remainder was too short to reach into the pelvis, and therefore could not readhere to the pelvic organs. The patients who had omental adhesions were usually those who had had one or more previous operations or suppurative conditions such as salpingo-oöphoritis or appendicitis. The omentum was removed as the first procedure in these cases before the other lesions were taken care of. In my private practice, I have continued to cut off the omentum in such cases, but as the years have gone by, the tendency has been to remove the omental apron at a higher and higher level.

The American literature reveals no one advocating the removal of the omentum, but on the contrary lays stress on the important functions that are performed by this structure, such profound silence suggests that the procedure is so radical and would be followed by such dire results that the subject should not even be discussed.

The almost universal practice seems to be to let the omentum alone except where by its adherence it is causing definite obstructive symptoms or displacement of the organs. Under these conditions, the omentum is simply freed at the point where a dysfunction is being caused, and is then allowed to drop back into the abdomen, no attempt being made to free any more of it that may be adherent elsewhere. This procedure is still carried out, although nearly all surgeons will agree that adhesions recur in spite of all attempts that have been made up to the present time to prevent them. Their hope is that the adhesions will not again cause as severe a dysfunction as that for which they are operating, or at least that the immediate cause for operation will be relieved. They know

that any new loose connective-tissue adhesions are unlikely to cause immediate severe symptoms following operation. It is only when these adhesions become old and thickened and necessarily shortened that they give rise to kinking of the bowel, intestinal obstruction, displacement of organs, occlusion of tubes and so forth.

Surgeons throughout the years have realized the seriousness of adhesions following operations and have tried all sorts of bizarre means to prevent them. Jones and McClure¹ have enumerated the foreign substances which have been introduced into the abdominal cavity in order to prevent the contact and agglutination of injured surfaces until healing can take place. To this end innumerable solutions, gases, oils, waxes and membranes—such as oxygen, nitrogen, air, salt solution, dextrose, sodium citrate, olive oil, lanolin, gelatin, paraffin, gum arabic, silver foil, gutta-percha, Cargile membranes, amniotic fluid and silk—have been tried, and they have all produced the very thing that they were introduced to prevent. These surgeons either do not know or do not believe Hertzler's² rule: "What the peritoneum cannot absorb it walls off or dies in the attempt. Any foreign body not capable of absorption is encapsulated." They have tried all the above methods, but would not dream of touching the omentum because they have been taught certain things in regard to it which make them loath to do so any oftener than is absolutely necessary. I shall mention several of these statements that are accepted without question, and shall attempt to prove that they are not pertinent.

Jones and McClure¹ state

The regularity with which the omentum is found attached about diseased foci with more or less complete walling off or isolation of the process has earned for it such striking designations as "the policeman of the abdomen" and "the abdominal leukocyte," and much has been written about its almost intelligent migratory powers.

That the omentum has the intrinsic ability at a moment's notice to rush to the site of an acute infection and wall it off is quite fantastic. Florey and Carleton³ have shown that the movement of the omentum is entirely extrinsic. The factors influencing its change in position are

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posture, gastrointestinal peristalsis and diaphragmatic excursions. If one of these factors does not happen to bring the omentum to the site of infection, or, as is often the case, the omentum is too short to reach the focus, the intestines themselves will be forced to perform the function of walling off, and usually do.

Jones and McClure claim that the removal of the omentum is very likely to be followed by acute generalized peritonitis if the patient happens at a later date to develop a suppurative focus of infection and the omentum is not present to wall it off. I believe that the omentum plays a part in walling off areas of disease and foci of infection and often prevents generalized peritonitis, but this does not necessarily mean that the visceral peritoneum could not perform that function just as satisfactorily if the omentum were not present. It has been estimated that the total peritoneal surface area is equal to the total skin area. The peritoneal covering of the omentum makes up only a small percentage of this surface. The parietal and visceral portions of the peritoneum remaining after the removal of the omental apron have the same physiologic absorptive properties as that covering the omentum, and will respond in just the same way to infection and irritation, causing serous exudation, a pouring out of leukocytes and fibrin formation, and the contiguous inflamed or irritated intestinal surfaces will adhere and wall off the infection in the same manner as does the omentum.

Jones and McClure also state that the omentum with its characteristic cells having distinct evolutionary history and function, is to be regarded as a parenchymatous structure analogous in some respects to the thymus gland and the bone marrow, they therefore believe that if the omentum is removed certain disease fighting enzymes or cells will be lacking to combat any future suppurative foci of infection. Modern pathologists⁴ contend that the peritoneal cells covering the omentum do not have these analogous functions.

Graves⁵ points out that the omentum is covered with two layers of peritoneum, one on each side, and that it is well supplied with blood and lymph vessels, which furnish a greater amount of serum and phagocytes than does the rest of the peritoneum. This is undoubtedly true, but the visceral and parietal portions of the peritoneum have enough of these properties so that they are able to glue themselves together and surround foci of infection when they are called upon to do so. This author also states that it has been shown by experiments that animals from which the omentum has been radically removed

are less resistant to peritoneal infection than are normal control animals. This may be so, but medical and surgical literature does not reveal that human subjects having little or no greater omentum have an increased susceptibility to peritoneal disease, and none of the patients from whom I have removed the omentum have developed peritonitis. The two commonest sources of suppuration in the abdominal cavity are the appendix and the fallopian tubes, and these have usually been removed at the first or a later operation. If this is not the case, the appendix should be removed and all pelvic disease corrected at the time of omentectomy. Therefore, the danger of generalized peritonitis occurring at some future date is only remote.

Graves adds that the omentum can be used to cover denuded and injured peritoneal surfaces. This is the exact process we wish to avoid, for these adhesions cause chronic invalidism, which fact has been evidenced by the number of cases that have to be operated on again and again. He also states that it takes two injured contiguous surfaces to cause adhesions between one organ and another. This being so, it is an unquestioned fact that if the adhered omentum is freed and again dropped back into the abdominal cavity it is bound to readhere, because, first, it is a relatively immobile structure and will return by force of gravity and by the factors that influence its movements to its normal position, and secondly, the injured omental surface which was freed will very likely again be in apposition to the injured peritoneal area from which it was freed, thus the adhesion will again occur, according to Graves's statement that two injured contiguous surfaces in close apposition to one another will unite. Graves apparently did not realize the importance of his statement, for he did not utilize it in order to combat adhesions. The significant words are "two and contiguous." This means that if two injured surfaces are separated and kept so, or if one of them is eliminated, adhesions will not recur. The rationale of removing the omentum in order to prevent adhesions is based on these two facts. If the omentum is cut off high enough so that it cannot reach the area from which it was freed, there will be no readherence, also no adhesion will occur in the pelvis, because the raw surface there will come into contact only with the normal visceral peritoneum, which is well lubricated by serous secretion, the intestinal loops, slipping by one another and moving from place to place, will not as a rule be in contact with a mildly irritated surface long enough to unite with it.

Graves also points out that the omentum slips

into hernial openings and prevents the entrance of bowel. It is also considered a storehouse for fat, and undoubtedly acts as a blanket for the intestines and prevents their sudden chilling. These functions may well have been important in the Stone Age, but they are of little significance in the modern era of superheated homes and warm clothing.

When I perform pelvic operations, I open the abdomen by a midline incision from the umbilicus to the pubis (Fig 1). The adherent omentum is dissected free by cutting the weblike or fibrous con-

splenic flexure, after each blood vessel that is visualized has been sutured. As soon as the heavy, redundant omental apron is removed, the whole colon, relieved of this weight, has a tendency to be drawn into the upper abdomen above the umbilicus by the shortened greater omentum, which runs directly from the greater curvature of the stomach to the upper border of the transverse colon. Consequently, there is no longer a fat pad covered with serous membrane between the small intestine and the parietal peritoneum. This leaves a thin, raw area, about 0.3 cm thick, stretching

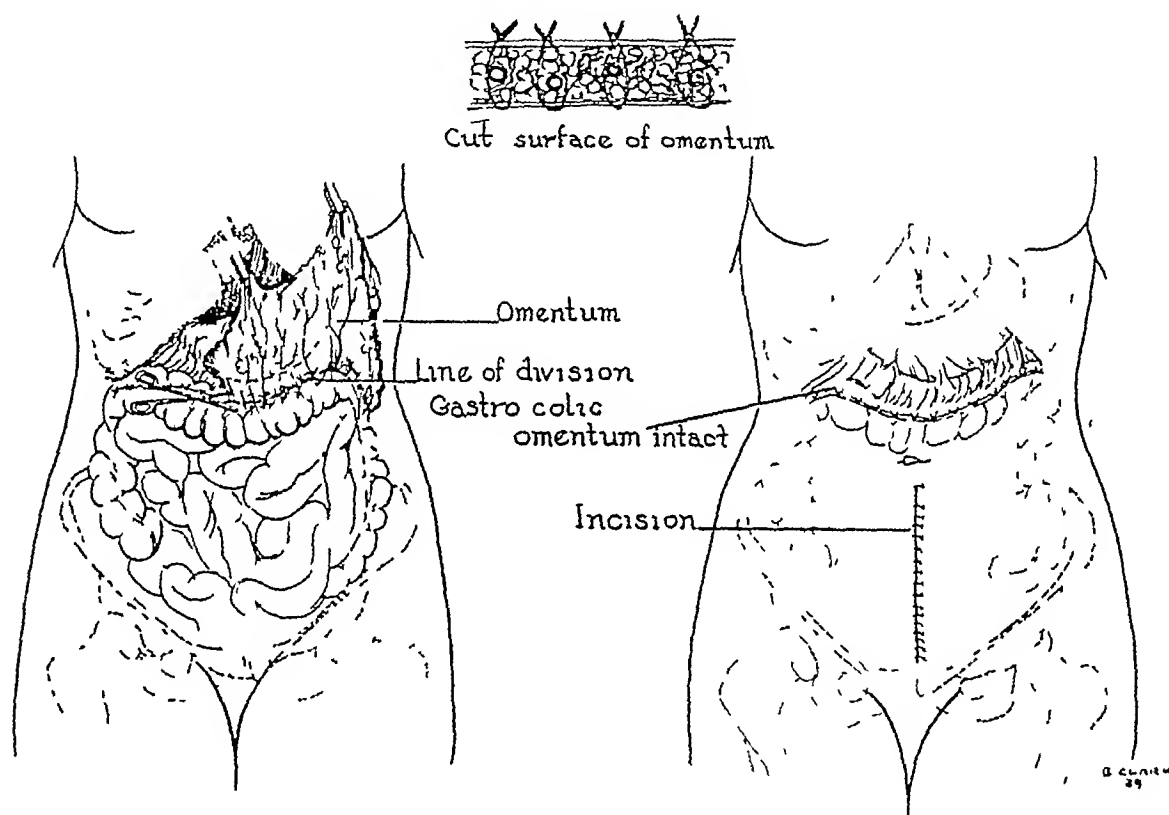


FIGURE 1

nective tissue that attaches it to the peritoneum. This leaves simply the peritoneal surface covered with serous cells and an overlying, practically bloodless, thin veil of cobwebby or somewhat fibrous connective tissue. This tissue has a very poor blood and lymph supply, and when cut produces slight exudation of blood and lymph, which is necessary for the formation of fibrin, there is therefore little tendency to adhere or readhere. Traction is next placed on the freed omentum, and it is pulled through the incisional wound. When it is pulled upward, the transverse colon is visualized and the attachment of the omentum to its superior border is noted. A suture is placed through the border of the omentum at the hepatic flexure, and the omentum is cut through just distal to the tie. The excision is continued along the upper border of the transverse colon to the

along the whole superior border of the transverse colon. The outer and inner surfaces of this incised area consist of a thin layer of epithelial cells, and in between are fat tissue and a lacework of connective tissue; there is no injured parietal peritoneal surface in the upper abdomen to which the cut edges of the incisional wound can adhere. As a matter of fact, the cut edges naturally adhere to one another, being contiguous and raw. The injured parietal peritoneum in the pelvis comes into contact only with the visceral peritoneum, and the viscera, continually changing position, do not stay in one place long enough to adhere unless the peristaltic waves have been temporarily stopped because of shock.

Graves states: "The chief function of the peritoneum is to secrete enough serous fluid to lubricate its highly polished serous lining so that the

stomach and intestines are free to move around in the abdominal cavity with the greatest of ease, and so that there is no interference of the normal peristaltic movements of these organs." These movements are necessary for the proper digestion of food and the elimination of waste products, and if the omentum is drawn down into the pelvis it is bound to cause continuous pulling and kinking of the transverse colon and stomach. By compression it also interferes with the peristaltic movements of the small intestine, thus preventing the normal digestion of food and the elimination of waste products, and giving rise to all sorts of gastric symptoms, such as fullness, gaseous eructations, pain, distention and constipation.

There are other factors which must be complied with if postoperative adhesions are to be prevented

Normally there are a few cubic centimeters of excess serous fluid in the abdominal cavity. But if a patient is debilitated or dehydrated there is less than normal serous exudation on the surface of the peritoneum, and therefore less lubrication and conversely more friction. If such a peritoneal surface is handled at operation, its delicate covering of relatively dry endothelial cells is more easily injured and it more readily adheres to another area. Therefore it is well to combat dehydration before operation by forcing fluids, and to institute routine intravenous therapy postoperatively for at least three days until the patient is again taking plenty of fluids by mouth.

The patient should be anesthetized so that there is complete abdominal relaxation and deflation of the viscera. A basic Avertin anesthesia, supplemented by ether, or a spinal anesthesia with novocain and Pontocaine gives the relaxation that is needed if the adhesions are to be easily dissected free without causing trauma and later, adhesions.

Finger dissection and forcible separation of adhesions by traction should never be done. Such a procedure results in more raw surfaces and thus defeats the purpose of the operation. Only the redundant part of the omentum which is to be removed should be touched by instruments or by the hand.

If the anesthesia is satisfactory, there is little or no need of walling off the viscera by the insertion of packing tapes or heavy retractors, which may in themselves cause trauma to the delicate peritoneal cells.

If clamps have to be used on the cut edges of the peritoneal incision they should be placed on the very edge, and when the peritoneum is closed these areas, traumatized by clamps, should

be turned outward, leaving no injured areas along the line of suture to which the intestines may adhere.

After any complete anesthesia there is a period when the intestinal tone is entirely lost and when there are no peristaltic waves passing along the intestinal tract, thus there is very little slipping around of the loops of intestine except that caused by diaphragmatic excursions. It is during this postoperative period that the patient must be moved from side to side so as to ensure movement of the coils of intestines by change of position.

In view of the dire results that have been prophesied should the omentum be removed, the case histories of the 76 patients from whom I have removed in the last seventeen years either all or a large part of the omentum have been reviewed in order to ascertain just what good or bad results have followed. Sixty five patients had had previous operations and most of these had subsequently been suffering from chronic gastric disturbances. Forty-one patients had had one operation, 12 two, 11 three and 1 four.

Following omentectomy, 11 of the 76 patients had a subsequent operation. These case reports are briefly as follows:

CASE 1. D. F. had an operation for peritonitis, then an appendectomy and omentectomy for adhesions. After this she had an ectopic pregnancy and a few light adhesions were found. She has been well since then.

CASE 2. B. K. had an appendectomy then a fibroidectomy, an omentectomy and a suspension operation. Later she had persistency of chronic metritis and underwent a hysterectomy. No adhesions were found.

CASE 3. A. S. had a salpingo-oophorectomy then a colpotomy for pelvic abscess, then a hysterectomy and then an operation for intestinal obstruction with omentectomy for adhesions. Later a laparotomy was performed for symptoms simulating intestinal obstruction but she was evidently suffering from hysteria since no adhesions were found, and the abdomen was sewed up without any abdominal manipulations. The patient has been well since then.

CASE 4. D. C. had a salpingo-oophorectomy and appendectomy then a hysterectomy and then a laparotomy and an omentectomy for adhesions. One subsequent laparotomy was performed in order to free visceral adhesions. The patient has been well since then.

CASE 5. M. B. had had an oophorectomy and appendectomy before I performed a hysterectomy for fibroids and omentectomy. Since then she has had two operations in a neighboring town the types of which are unknown.

CASE 6. E. K. had had an appendectomy before I performed a hysterectomy for fibroids and removed the omentum. Following this she had a cholecystectomy. Adhesions were found in the region of the gall bladder. Since then she has been well.

CASE 7. M. F. had an appendectomy and then a left salpingo-oophorectomy and omentectomy. Following

this she had a hysterectomy, very few adhesions were found. She has been well since then.

CASE 8 J K had had an appendectomy and suspension before I performed a left salpingo-oöphorectomy and omentumectomy. Later she had a hysterectomy for pelvic symptoms, a few adhesions were found.

CASE 9 M R had had an appendectomy, then a hernial repair and oöphorectomy, and then gall bladder drainage. I did a hysterectomy for fibroids, found adhesions and removed the omentum. Subsequently the patient had a cholecystectomy, there were a few adhesions in the gall bladder region, but none in the lower pelvis.

CASE 10 H S had had no previous operation until I performed a suspension and removed part of the omentum. Later she had a cholecystectomy for cholelithiasis, no adhesions were noted.

CASE 11 G M had had an appendectomy before I performed a left salpingo-oöphorectomy, suspension and myomectomy and removed most of the omentum. She later had an operation by another surgeon, but no report is available.

Except for Cases 5 and 11, concerning which information is lacking, it can be said that none of the 76 patients have had to undergo a subsequent laparotomy because of any complication arising from the removal of the omentum. All patients are alive except 4 who had cancer at the time of operation and had their omenta removed on account of metastases. No intestinal obstruction has occurred. No acute infection has arisen. Apparently the adhesions present at the time of operation have not re-formed to a sufficient extent to warrant further operation, with one exception (Case 4).

It would be incorrect to say that these patients have no gastric and abdominal complaints, but our follow-up shows that they are all enjoying fairly good health considering their previous chronic invalidism. Forty-four patients have reported complete relief from their gastric and abdominal symptoms, 18 partial relief and 3 no relief. Four died from carcinoma, 7 have moved away and reports have not been obtainable.

SUMMARY

Omental adhesions cause distressing gastrointestinal symptoms and chronic invalidism.

Up to the present time no satisfactory method has been proposed that would prevent the re-adherence of the omentum.

Removal of the omentum is suggested as a fairly satisfactory method for treatment of omental adhesions after they have once occurred.

Case histories are cited to prove that no serious complications have followed omentumectomy.

Omentumectomy was only one portion of the operative procedure, and therefore all the good results following these operations cannot be at-

tributed to the removal of the omentum per se, but at least it enhanced rather than lessened the patients' chances of future good health.

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DISCUSSION

DR GEORGE M. WATERMAN, Providence, Rhode Island. I have never encountered the total removal of the greater omentum. Dr Larkin has given a good deal of thought to this subject, and has covered the ground and presented his argument very well. This procedure seems rather radical, however, I have had no experience with it, and Dr Larkin has. His results, he thinks, are very good. He believes that he has had no more recurrence of adhesions, or postoperative discomfort or complications, than have surgeons who do not practice this procedure. On the other hand, he has not reported any control series which would show whether or not his argument is sound.

Personally, I shall continue to believe in the value of the great omentum, and shall be loath to remove a structure which I have always thought was a protection. This is a matter that deserves our consideration, and one concerning which we may possibly change our opinions.

DR. JOHN ROCK, Boston. I have had, unfortunately or not, no experience in the removal of the great omentum. I have, to be sure, at odd times removed a fair-sized portion of the omentum when, in separating adhesions from pelvic tumors, I had mutilated a large part of it or interfered with its blood supply. I have also removed part of it without dissecting it free from, perhaps, a fibroid, to the circulation of which it was possibly contributing a major part. More often I have used it to cover injured areas after dissection for pelvic tumor.

I think we can all agree with Dr Larkin's very inclusive enumeration of the physiological properties of the omentum, and can agree with him that in order to exercise its function it does not have to be mobile. This is unlike the similar physiological functions of the peritoneum which covers the intestines. Dr Larkin has also emphasized the figurative terms which have been applied to the omentum, "the policeman of the abdomen" and "the abdominal leukocyte." I must confess that I still believe these terms to be justifiable.

I have not had much to do with general surgical complications such as ruptured gall bladder or perforating ulcer, but if I had, I should hope that the omentum would be present, and I know that if ever my appendix should rupture, or that of any of my friends, — and I use the word in the Rooseveltian sense, — I should hope that the omentum would be at hand.

DR JOE V MEIGS, Boston. My only experience in this matter was with one of Dr Larkin's own patients. In this case I found inside the abdomen a large, thick, smooth border of omentum that was high up. The patient was absolutely free of all adhesions, and had a perfectly

smooth omentum not over 8 cm. in length at any point. I can only offer this observation for what it is worth.

DR. DAVID CHIERVIZ Boston I will be frank in expressing doubts about Dr Larkin's thesis. I have always considered the omentum a somewhat unaccountable but very useful structure, and having all my life preserved it so far as I could, I am not very much inclined to give up this practice. I call Dr Larkin's attention to the fact that almost invariably when one operates on the abdomen of a person previously operated on, one finds the omentum adherent to the deep surface of the abdominal wound the adhesion rarely in my experience, causes any obstruc-

tion. I have always thought that this adhesion was a useful lesion and that it probably prevented the adherence of the intestine to the wound which in turn might prevent normal peristalsis. My own belief is that unless the changes in the omentum are such as to indicate its removal, it should be preserved.

DR. LARKIN (closing) I agree that it is well not to be too hasty in taking up new procedures and discarding the old. But when the old procedure causes the chronic invalidism that so often follows omental adhesions I believe it is time to try omentectomy which in my hands at least, has tended to prevent crippling adhesions.

THE PROGNOSIS OF INFANTILE TUBERCULOSIS*

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IN a recent study¹ of 345 deaths from tuberculosis at the Infants and Children's hospitals, the factor of age assumed outstanding importance. A high mortality was demonstrated in the first two years of life, as compared with a very low level in older childhood. Moreover, a significant difference in the pathologic lesions at different age levels was also apparent, deaths in infancy being usually the terminal event of milary tuberculosis, while those of older children were much more commonly due to tuberculous meningitis not associated with milary disease. In general, these findings have been observed by many other workers and were to be anticipated, but they increased our interest in the significance of the earliest years of life as the most valuable period for pediatric efforts against tuberculosis mortality. The importance of infancy, in contrast particularly with the later grade school period is shown by Table I with its 200 deaths in the first two years studied and its 6 deaths in the last two. In spite of the decrease in mortality during the period studied, the table shows how constantly the problem has been centered in infancy.

A natural outcome of the concentration of interest on infantile tuberculosis has been curiosity as to the fate of those tuberculous patients discharged from the Infants Hospital during a period of years comparable to that covered by the mortality study. In the fifteen year period from the beginning of 1924 to the end of 1938, 339 infants with some form of tuberculosis were seen in the hospital, and of this number 191 (56 per cent) died there. Data from their records form part of the preceding study. The present communi-

cation is based on a follow-up study of the remaining 148 infants who did not succumb to tuberculosis during their first hospital admission.

In almost all these infants there was roentgenological evidence of disease in the lungs or medi-

TABLE I Deaths from Tuberculosis 1923-1938

| Year | AGE IN YEARS | | | | | | | | | | | | Totals |
|--------|--------------|-----|----|----|----|----|---|----|---|---|----|----|--------|
| | 0-1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | |
| 1923 | 6 | 6 | 3 | 3 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 21 |
| 1924 | 16 | 15 | 6 | 1 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 46 |
| 1925 | 11 | 13 | 7 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 40 |
| 1926 | 12 | 12 | 5 | 3 | 4 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 40 |
| 1927 | 3 | 10 | 4 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 25 |
| 1928 | 6 | 8 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 21 |
| 1929 | 8 | 9 | 7 | 0 | 1 | 3 | 1 | 2 | 1 | 0 | 0 | 2 | 34 |
| 1930 | 4 | 10 | 3 | 4 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 27 |
| 1931 | 6 | 3 | 5 | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 20 |
| 1932 | 5 | 2 | 4 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 16 |
| 1933 | 3 | 6 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 13 |
| 1934 | 3 | 8 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 15 |
| 1935 | 2 | 2 | 1 | 3 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 12 |
| 1936 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 |
| 1937 | 2 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Totals | 88 | 112 | 55 | 27 | 17 | 15 | 6 | 11 | 5 | 3 | 2 | 4 | 345 |

astinal lymph nodes, but patients with tuberculous peritonitis, cervical adenitis or bone lesions were included in the present study if they also showed evidence of tuberculosis in the thorax. Three tuberculin-positive infants with negative roentgenograms were also included, on the ground that their infection could hardly be entirely healed or inactive. In 32 cases no satisfactory data as to the course of the patient after discharge could be obtained their omission brought the total number of records available for study down to 116. These infants were traced by letters and home visits to parents, by reports from other hospitals, sanatoriums and tuberculosis clinics, and by reference to our own records on those patients now attending the clinic. Since our first interest was in the survival of these children, we have not yet attempted to have them all

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brought back for re-examination and roentgenograms. Indeed, the impression resulting from this and similar work in other clinics suggests that the present roentgenological status of children who have now reached the low-mortality ages of later childhood would be mainly of academic interest.

An early impression which was confirmed by the results of this investigation was that subsequent deaths from tuberculosis in the later life

the surviving and non-surviving patients are included, and show a slightly older age at diagnosis for infants whose course was favorable. Table 3 presents the length of known survival after the disease had been discovered, and brings out again the short period between diagnosis and a fatal termination, when that occurred.

The more important roentgenological findings at admission are shown in Table 4. Here the fatal cases are limited to those which did not have

TABLE 2 General Summary

| STATUS OF PATIENTS | NO. OF CASES | | AVG. AGE ON ENTRY mo |
|--|--------------|--|-------------------------|
| Total tuberculous patients | | | 339 |
| Died of tuberculosis in hospital | 191 (56%) | | 11.6 |
| Discharged alive | 148 (44%) | | |
| Untraced | 32 | | |
| Traced | 116 | | |
| Later died of tuberculosis | 42* (36%) | | 11.3 |
| In less than 6 mo | 36 | | |
| In 6-12 mo | 5 | | |
| At 18 mo | 1 | | |
| Died of nontuberculous disease | 5 (4%) | | |
| Survived | 69 (60%) | | 13.1 |
| To the present | 47 | | 13.2 |
| At least 1 yr (present status unknown) | 22 | | |

*Nineteen patients had miliary or meningal tuberculosis on admission.

of these infants occur almost always within a year's time. In fact, in only 1 of 42 infants who succumbed after leaving the hospital did death occur more than twelve months after the diagnosis was made. This patient lived only eighteen months. Because of this critical significance of the first year after diagnosis, we have included in our statistics the records of 22 infants whose present status is undiscoverable but who were traced and in apparently good health.

evidence of meningitis when the patients first came to the hospital. In some cases a patient was listed in more than one of these classifications, as when there were coexistent enlarged soft shadows and calcification at the hilus. By diffuse congestion is meant the frequently observed and poorly circumscribed patchy or mottled shadows suggesting the appearance of bronchopneumonia. In no case have such findings been included unless their persistence in repeated films

TABLE 3 Length of Survival of Tuberculous Infants Living at Discharge *

| STATUS OF PATIENT | SURVIVAL IN YEARS | | | | | | | | | | | | | | | TOTALS |
|-----------------------|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|-------|-------|-------|-------|--------|
| | Under 1 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | |
| Now living | 2 | 4 | 10 | 2 | 2 | 5 | 4 | 3 | 2 | 5 | 1 | 1 | 1 | 2 | 3 | 47 |
| Alive when last known | 0 | 3 | 2 | 1 | 1 | 5 | 2 | 3 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 22 |
| Died of tuberculosis | 41 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| Grand total | | | | | | | | | | | | | | | | 111 |

*Omits 5 patients who later died of nontuberculous causes.

at least one year after being at the hospital. More than half these children had survived over five years before they were lost from the records. Since there seems to be so little evidence from the known fatalities that such patients went on to death from tuberculosis thereafter, it seemed reasonable to use them for drawing certain of our conclusions.

Data have been arranged in several tables, on which brief comment may be made. Table 2 presents a general summary, the average ages of

indicated their specific etiology. It will be observed from Table 4 that 1 infant with what was assumed to be miliary disease survived, and that no patients with calcification when first seen later died of the disease. Moreover, the 3 infants with positive tuberculin tests but negative roentgenograms were all in the group with a favorable outcome.

No tabulation of later exacerbations of tuberculosis in the group of survivors is presented, nor have we exact enough data to enable us to

discuss the difficult question of the activity or healing of their earlier infections at the present time. It is known, however, that 6 of the survivors developed foci which persist at the present time. These include 1 child who now has tuberculous cervical adenitis, 2 with cervical adenitis and skeletal tuberculosis and 2 with skeletal lesions only. The sixth and most interesting child has apparently developed a reinfection or adult-type lesion in the lungs. This patient was seen in the hospital in 1924 at the age of seven months, with

TABLE 4. Outcome with Relation to Findings in First Roentgenogram*

| ROENTGENOLOGICAL DIAGNOSIS | NO OF PATIENTS | DEATHS NO. PT CLINT | SURVIVORS NO. PT CLINT |
|-------------------------------|-------------------|---------------------------|------------------------------|
| Miliary tuberculosis | 12 | 11 92 | 1 8 |
| Parachymal consolidation | 34 | 11 32 | 23 68 |
| Diffuse congestion | 37 | 11 30 | 26 70 |
| Enlarged hilus | 10 | 1 10 | 9 90 |
| Calcification | 10 | 0 0 | 10 100 |
| Negative | 3 | 0 0 | 3 100 |

*Omits 15 patients with meningitis at first examination.

physical and roentgenological signs of dense consolidation throughout the left upper lobe, a result of intimate contact with a tuberculous mother. She spent the next two years at a sanatorium for tuberculous children, and was discharged at the age of three with regression of the lesion and the appearance of calcification. After two admissions to other institutions, mainly because of poor home conditions, the child was found at the age of fourteen to have developed a soft subapical shadow on the left, for which she was again hospitalized as having minimal adult-type tuberculosis. She has remained sputum negative, but artificial pneumothorax has had to be abandoned because of old pleural adhesions.

COMMENT

The fate of the tuberculin-positive infant has been the subject of a number of recent communications in the literature, a few of which may be briefly reviewed before making general comment on the present series.

Briley⁷ in 1936 published observations on 170 infants studied at the Harriet Lane Home in Baltimore. Somewhat more than half these patients were colored. The maximum period of observation was five years, and the material was tabulated with particular reference to the presence or absence of lesions demonstrable by roentgenogram at first admission, and to the presence of sputum-positive contacts. Sixty-seven patients had a parenchymal lesion at first examination, 36 had bulging tracheobronchial nodes and 67 had negative chest x ray films, the mortality within

these three groups was 40 per cent, 13 per cent and 9 per cent respectively. Approximately 70 per cent of all deaths occurred during the first year following the discovery of the infection. The total five year mortality for the colored children was 31 per cent, as against 13 per cent for the white children.

As a part of Rosenberg and Kereszturi's⁸ investigation of BCG in New York City, a group of non vaccinated infected infants was observed for one to nine years. They report a death rate of 9 per cent for 348 infants followed. In the majority of cases in which roentgenograms were made, no evidence of tuberculosis was found, so that their group represents, even more than does Brayleys, a milder degree of infection than was present in our patients. All the 32 fatalities in their series occurred by the end of three years, and more than half of these during the first year. Tortone and his associates⁹ have recently reported on the course of 209 infants reacting to tuberculin at the Lymanhurst Health Center. In a follow up period averaging five years there were 10 deaths from the disease. Again, a large proportion of these patients were roentgenologically negative.

A very extensive study by Söderling¹⁰ is based on 912 tuberculous infants observed at three hospitals in Stockholm during a period of twenty-five years. Of this large series, 487 died of their disease within three years after its discovery, 90 per cent of the deaths occurring within the first year. During the same period 13 patients succumbed to nontuberculous infections. Of the 412 surviving patients, 405 were followed for periods varying from five to twenty five years, a record which arouses the envy of anyone who tries to trace the later course of even a hundred infants. It was discovered that only three of the 405 patients succumbed to tuberculosis during this period. In view of his observations, Söderling suggests that a considerable degree of immunity had been established by the infection in infancy.

Such statistics as those reviewed above demonstrate wide variations in prognosis, depending on the degree of involvement at the time the infection is discovered. The most satisfactory results are those from institutions whose work is largely case finding in nature. In the earlier years of the present study, the majority of tuberculous infants died during their first admission of miliary or meningeal tuberculosis—conditions already present in most of them at entry. Those discharged alive usually represented cases of advanced disease, so that few were expected to survive. In more recent years it has been possible to discover and admit more infants in earlier stages of infec-

tion A smaller proportion of such patients have died in the hospital, moreover, more of those discharged alive are surviving

From all studies, including our own, it seems fairly certain that tuberculous processes in infancy run a comparatively acute course Once an infected infant has survived a year—or perhaps two years—after the discovery of his disease, his prognosis becomes reasonably favorable and a relaxation of care and observation is permissible It is obvious from all the references that infection beginning in the earlier months of infancy terminates in a higher percentage of fatalities than that which arises nearer the age of two years It is also apparent that the outlook for the tuber-

groups Important alliances can be made between pediatric clinics and obstetric hospitals, so that the newborn infants of tuberculous parents can be regularly tested for infection during the dangerous years To await the development of symptoms in infants before looking for tuberculosis is an even graver error than it is in adult patients Too often the appearance of symptoms is the outward evidence that an irreversible pathologic process has begun Responsibility for diagnosis before the onset of this phase rests on the physician and the clinic The means of diagnosis are the family history, the tuberculin test and the roentgenogram The results of such efforts should be not only an ultimate diminution in the number of

TABLE 5 Comparison of Results in the Three Five-Year Periods

| RESULTS | PERIODS OF ADMISSION | | |
|-------------------------------------|----------------------|-----------|-----------|
| | 1924-1929 | 1929-1934 | 1934-1939 |
| Total tuberculous patients | 173 | 100 | 66 |
| Died in hospital | 106 (61%) | 56 (56%) | 29 (44%) |
| Living at discharge | 67 | 44 | 37 |
| Untraced | 24 | 6 | 2 |
| Traced | 43 | 38 | 35 |
| Died after discharge | 17 | 16 | 9 |
| Died of nontuberculous disease | 3 | 1 | 1 |
| Survived for over 1 yr | 23 (54%) | 21 (55%) | 23* (66%) |
| One year survivors | 13% | 21% | 35% |
| Total mortality due to tuberculosis | 71% | 72% | 58% |

*Actually 25 survivors but 2 have not completed the full year

culin-positive infant can be made more favorable than it once was This is demonstrated by a division of the fifteen-year period of the present study into three periods of five years each, as shown in Table 5 It is gratifying to note that the percentage of tuberculous babies surviving for a year after discovery was more than twice as great for the last as for the first five years studied However, even in the last period nearly half the tuberculous infants brought to the hospital died shortly following their first and only admission Death often occurred only a few days after entrance, at which time the disease was usually present in a miliary or meningeal phase

Thus, whatever improvement can be shown for prognosis is largely the effect of earlier diagnosis rather than of better therapy The line of successful attack against tuberculosis as a pediatric problem is clearly indicated The excellent results from Lymanhurst and from New York City demonstrate how much can be done by methods which seek out infected infants by case-finding methods before those patients would ordinarily be brought to a hospital for sick children Children's hospitals and clinics, and private practitioners as well, should seek out the infant siblings of tuberculin-positive older children, instead of concentrating so much time and attention on those in safer age

tuberculous infants, but also a better prognosis for those discovered

SUMMARY AND CONCLUSIONS

Since the great majority of deaths from tuberculosis during infancy and childhood occur in the first two years of life, the attention of pediatricians must be centered on infancy as the most important age period for further lowering the mortality from this disease A study of the outcome of tuberculosis in 339 infants over a period of fifteen years has demonstrated a 56 per cent mortality for the group during the first admission to the hospital Of the 116 remaining patients whose course is known since discharge to other institutions or to their homes, more than half have survived for one to fifteen years after the original diagnosis was made In all but 1 of those who succumbed to their disease this event occurred within twelve months, 1 infant died after eighteen months Five later developed a skeletal or glandular tuberculosis, and 1 an adult type of pulmonary tuberculosis

A review of other reports in the literature indicates a wide variation in the prognosis for the tuberculous baby The mortality varies directly in proportion to the degree of disease evident at discovery In the present study almost all in

infants had roentgenologically significant disease at that time, but efforts directed toward earlier recognition of infection in recent years have been rewarded by a significant increase in the number of survivors. Such efforts must be made by private physicians, clinics and other institutions aware of the value of diagnosis by family history, tuberculin testing and roentgenography before symptoms appear.

Attention is called to the acute nature of infantile tuberculosis, and to the attendant improve-

ment in prognosis once the infant has survived the critical year after discovery.

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GANGRENE OF THE SCROTUM AND REPAIR BY A SIMPLE PLASTIC OPERATION*

Report of a Case

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IT IS not the purpose of this paper to discuss in detail the various types of gangrene of the scrotum, but simply to give a brief outline of the various methods, to report a case and its preoperative treatment, and to describe a simple plastic operation.

Gangrene of the scrotum may be classified under two headings.¹ To the first belongs secondary gangrene following infectious diseases, such as diabetes, the terminal stages of gangrene following some total pathologic change, such as abscess and cavernositis, and cases of mechanical origin due to chemicals, excessive heat or frostbites. To the second group belong the so-called "idiopathic" or spontaneous types of gangrene known as streptococcal gangrene and gangrenous erysipelas. As regards the latter group, there can now be little doubt as to the infectious nature of the condition. We know that there is a gangrene produced by gas-forming organisms, as well as the cases of streptococcal gangrene. It is my belief that the term "idiopathic" is rather loosely applied, and that such cases are for the most part examples of symbiotic gangrene.

The case here presented falls into the last named group. The early pathologic changes are striking, with a close resemblance to erysipelas. There is sudden acute inflammation at the onset. The skin becomes reddened, tense and glossy, and there is usually no evident portal of entry for the organisms. Campbell² states that the mode of entry is unknown, but that it is assumed that the organisms are rubbed in by friction of the clothing.

There may have been some abrasion to the skin or urethra, unknown to the patient. The surface readily pits on pressure, with the appearance of an exudate and desquamation of the dependent parts. Following this, the gangrene may spread rapidly in all directions. A line of demarcation may soon appear, or the gangrene may spread to the groin or even upward to the umbilicus or axilla. Extension usually follows the fascial planes of Scarpa and Colles. If untreated, the slough soon separates, usually in two or three days, and comes away as a foul smelling mass, leaving the testicles and penis relatively free of involvement. However, as was noted in the present case, there is frequently exposure of vessels, with the subsequent danger of hemorrhage. With proper care, improvement may immediately be noted, with rapid granulation and in time even complete regeneration of the scrotum.

The general methods of treating cases of scrotal gangrene have for the most part been fairly satisfactory. Wide excision of the involved skin and subcutaneous tissues, with continuous postoperative hot dressings of a 1:5000 solution of potassium permanganate, has seemed to work very well in many cases.

Just how important a part antistreptococcus serum may play in the treatment of some of these gangrenes, I am as yet unable to state, and the same holds true for the use of sulfanilamide. I think that at the present time by far the most effective drug to be used in cleaning up the infection is zinc peroxide.

The active treatment with zinc peroxide should not be started until the determination of the bacteriological flora of the wound has been reported.

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This type of treatment should be used only when the organisms which are found are known to be susceptible to peroxides, such organisms include the anaerobes, the microaerophiles and certain aerobes, including the ordinary hemolytic streptococcus. It is a well-established fact that certain of the so called anaerobes are strictly anaerobic in their cultural requirement, while others seem to be in an intermediary group, growing under a slightly reduced oxygen tension and later adapting themselves to aerobic cultivation. These bacteria have been referred to as microaerophilic.³ Frequently it is possible to make a clinical diagnosis of anaerobic infections. However, anaerobic methods of bacterial cultivation are obviously necessary for accurate determination of the nature of the infection.

When the presence of these organisms has become established, there must be a preliminary surgical procedure which will render it possible to apply medication directly to the affected tissue in such fashion that the main focus will be removed, and the material then have access to the residual infection.

Zinc peroxide has been used also as a prophylactic in surgical wounds, where contamination with anaerobic and microaerophilic organisms is suspected. The prophylactic use of the drug is more logical than is its use for active treatment, as the organisms have not yet invaded the tissues. While treating active infections, zinc peroxide must be applied to every part of the wound surface, because its action does not extend far from the point of local application, as has been demonstrated *in vitro*.

The work of Meleney and Johnson⁴ indicates that the liberation of oxygen and production of hydrogen peroxide depend on the presence of water. They therefore suggest that the zinc peroxide be applied suspended in sterile distilled water, with the dressing sealed in order to prevent evaporation.

Zinc peroxide is finely divided white powder, having the consistence of chalk or talcum. It must be heated at 130 to 140°C from one to four hours in order to sterilize it and to mobilize the oxygen. For use it is mixed with roughly ten parts by weight of distilled water⁵, this is accomplished by means of a sterile glass syringe, the result being an even, creamy suspension. More water may have to be added during the dressing.

The mixture is injected from the syringe so that it comes in contact with every point of the infected surface, especially beneath the undermined skin and down into the sinuses, using a small catheter when necessary. Where the zinc

peroxide does not reach the organisms, they will continue to grow. Strips of gauze or silk are dipped in the suspension and introduced under the skin edges until the wound is completely covered, including the edges of the normal surrounding tissue. The dressing is then sealed with a double layer of vaselized gauze on zinc-oxide-impregnated gauze. The dressing should be changed daily and the old zinc peroxide washed away with sterile water or saline solution.

In the case about to be reported, there was a very marked improvement at the end of three days. The exudate decreased, and granulations appeared and became very firm. At the same time extension of the infection stopped abruptly, and



FIGURE 1 Preoperative Lesion

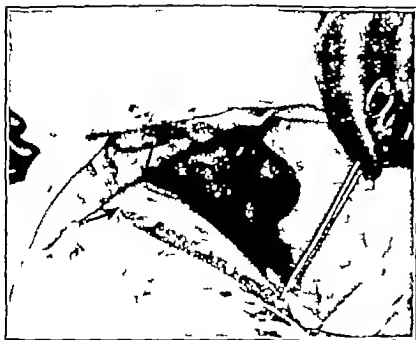
This photograph was taken 24 hours prior to operation on the day the zinc peroxide dressings were discontinued

the undermined edges were sealed off almost overnight. There were, however, a few areas which persisted for several days, appearing as whitish-gray patches associated with discharge but these responded well to treatment in a very short time (Fig 1).

CASE REPORT

J D, a 48-year-old, Italian-born cook, was admitted to the Boston City Hospital on April 13, 1938, complaining of pain, redness and swelling of the scrotum of 3 days' duration. He stated that he had noticed a swollen, non-tender "pimple" on his scrotum intermittently for several years. However, this had given him no trouble until 3 days prior to entry, when, while working over a hot stove, he noticed a burning sensation in the scrotum and began to feel weak and sick. That evening he discovered that the scrotum was red and tender. He was seen by his physician, who advised the application of icebags, and, as the condition became more severe, referred the patient to the hospital. The past history was essentially negative. The patient had had one attack of hematuria 8 years previously. He had had gonorrhea in 1917.

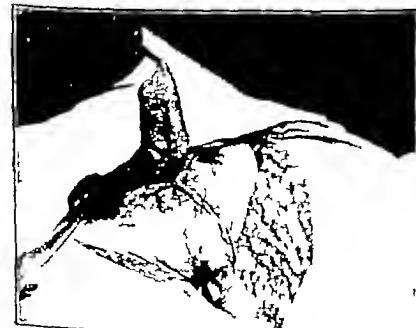
Physical examination revealed a robust, healthy-appearing man with marked dental sepsis. The general examination

FIGURE 2. *Technic of Operation*

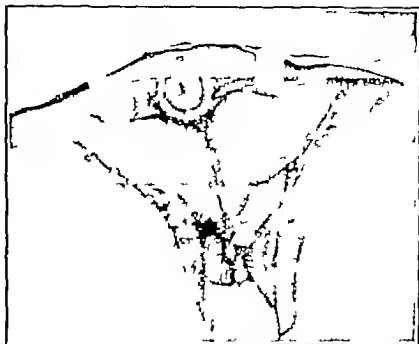
The arrows point to the pedicle of the flap on the right thigh and the line of incision for the flap

FIGURE 3. *Technic of Operation*

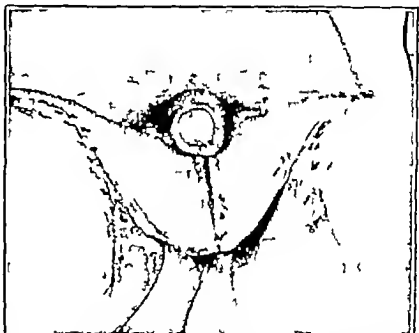
The flap on the right thigh has been dissected free to the pedicle

FIGURE 4. *Technic of Operation*

The flaps from the right and left thighs have been reflected over the testicles and stitched together in the midline

FIGURE 5. *Technic of Operation.*

The skin defects have been obliterated gauze drains inserted and the final sutures and skin clips placed

FIGURE 6. *Result on the Day the Sutures and Clips Were Removed*FIGURE 7. *Result on the Day the Sutures and Clips Were Removed*

This view shows the pedicles of the flaps before they were severed

was otherwise negative. Locally the scrotum was edematous and hyperemic, with a denuded area approximately 6 cm in diameter, around which there was an area of necrotic tissue with surrounding inflammation. The entire involved area was moderately tender.

Laboratory examination showed an alkaline urine containing no sugar or albumin. The sediment was free of cellular elements at all times. The hemoglobin was 65 per cent, the red-cell count 5,370,000 and the white-cell count 14,000, with 75 per cent polymorphonuclear neutrophils, 17 per cent lymphocytes, 3 per cent eosinophils, 3 per cent monocytes and 2 per cent basophils. A blood Hinton test was negative. The blood nonprotein nitrogen was 35 mg per 100 cc. The fasting blood sugar was 132 mg per 100 cc.

On admission a diagnosis of gangrene of the scrotum was made and the scrotum was immediately incised in several places. Chlorinate dressings were applied, however, the necrotic tissue continued to increase. There was no evidence of urinary extravasation. On the 4th hospital day the entire scrotum was involved and the process had started to spread to the thighs and abdominal wall. A culture was taken at this time. A complete debridement was then done, removing the gangrenous tissue completely to the line of demarcation, which extended from the base of the penis anteriorly to the anus and posteriorly and laterally to both thighs. The testicles were entirely denuded and seemed to be involved by the gangrenous process. However, they were left intact. A zinc peroxide dressing was applied, following the prescribed method.

Three days later the culture was reported positive for a hemolytic streptococcus with anaerobic properties and for *Staphylococcus aureus*. The white-cell count had dropped to 9400. The area was remarkably clean, and the foul odor had disappeared. There was early evidence of granulation and no further spread of the gangrene. However, daily zinc peroxide applications were continued in order to ensure destruction of all organisms and to promote granulation. The underlying margins gradually became sealed off, with signs of epithelization. Two weeks after the debridement the area was completely covered by fresh and healthy granulation tissue and was free of organisms by culture.

Twenty-eight days after debridement there was but little evidence that the scrotum would regenerate. A plastic operation was done, at which time two large pedicle flaps were freed from the inner surface of the thighs, the bases of which were just below the inguinal line, ensuring good blood supply (Figs 2 and 3). These flaps were so formed that they were turned over the testicles, completely covering them and forming a sac (Fig 4). The edges were approximated by the use of silkworm gut stay sutures, reinforced by skin clips. The sac was drained with rubber tissue. The denuded area left by the formation of the flaps was completely closed at this time, this being possible because of the loose skin associated with loss of weight by the patient (Fig 5). Two gauze drains were placed under each pedicle and a snug, dry sterile dressing was applied. A Foley self-retaining catheter was inserted to aid in maintaining cleanliness at the operative site.

There was no postoperative sepsis, and the circulation was very good. The pedicles were severed separately and

the newly formed sac rapidly assumed the appearance of a normal scrotum (Fig 8).

Some type of scrotal support must be worn for at least three months following this type of plastic operation in order to prevent excessive sagging.

Many of these cases heal without a plastic operation, but there are a certain number of cases,



FIGURE 8 Final Result

such as the one reported, in which, unless a plastic operation is performed, the testes and scrotum become so bound down by scar tissue that the urethra is involved, thus causing a stricture that later on in life may require operative interference.

SUMMARY

A case of extensive gangrene of the scrotum is reported, the treatment by the excision of necrotic areas and the use of zinc peroxide in cleaning up the infection is discussed.

A simple plastic operation for reconstructing the scrotum is described, which should be used only in those cases of extensive gangrene that may lead to stricture formation.

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URETHRITIS FOLLICULARIS*

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AVAILABLE published works, including text books, are rather vague in their description and evaluation of the nodular or polypoid protruberances frequently encountered at the proximal portion of the female urethra and bladder neck. These nodules are visualized with the foroblique telescope and the McCarthy cystourethroscope by withdrawing the instrument into the urethra with the irrigating fluid actively flowing. Some are club-shaped, with a small pedicle, others are blunt, with a broad base. While they appear to be more commonly situated near the bladder neck, they may extend for a variable distance into the urethra. The nodules are covered by normal appearing mucosa. Careful observation usually reveals one or more blood vessels entering them at the base. These projections have been frequently referred to as inflammatory tags or polyps of the female urethra. Because of their obviously benign character, they have seldom been subjected to biopsy.

I have removed a few of these nodules from 3 women for microscopic study. The patients were in their third, fourth and fifth decades respectively. All 3 showed infection of the uterine cervix and pus and bacilli in the urine obtained by catheterization. Two had cystoceles with incontinence. One had a proved papilloma of the bladder near the right ureteral orifice, and a right pyelonephritis presumably associated with the mild obstruction occasioned by the papilloma. No patient had at any time had hematuria, although it was present in several of the reported cases of follicular lesions elsewhere in the urinary tract. The biopsy specimen in each case revealed a solitary lymph follicle with densely packed lymphocytes at the periphery and a typical germinal center (Fig. 1).

This lesion is not confined to the female urethra. Figure 2 shows the typical lymph follicle from a presumed polyp removed from the prostatic urethra near the internal orifice of a sixty-two-year-old man with a profound bacillary infection secondary to an infected hyperplastic prostate.

In one of the sections taken from the female urethra, lymph follicles and glandular structures were found in the same polypoid mass (Fig. 3). In the gross this structure differed not at all from the others.

Since there is a paucity of literature on urethritis follicularis, it should prove profitable to review briefly some of the more recent reports on follicular lesions elsewhere in the urinary tract. Kretschmer¹ in 1913 reviewed the literature on pyelitis follicularis and found only 7 cases. Of these the bladder was involved in only 2 cases, 1 of these being Kretschmer's. Hundley and Carson² in 1929 added 3 more cases of pyelitis follicularis to the literature. Hinman and Cordonnier³ stud-



FIGURE 1 Solitary Lymph Follicle in a Polypoid Mass Removed from the Proximal Portion of the Urethra in a Woman.

ied 7 cases of cystitis follicularis and biopsied 5. Six patients were women and 1 a man. The ages ranged from eight to sixty nine, although most of the patients were over forty. Colon bacilli were present in the bladder urine at intervals in all the cases. Colon bacilli were also reported in Kretschmer's case and in that of Von Frisch. Busch⁴ in 1905, by making serial sections of the urethra of cadavers, discovered lymph follicles in the fossa navicularis in 6 adult men ranging in age from twenty five to sixty seven years. He found none in the fossa navicularis of 2 newborn infants.

Pelouze⁵ reported 75 cases of what he designated as lymphocystic urethral lesions at and distal to the margin of the vesical outlet and attributed them to active tuberculosis. He later modified his

*Presented at meeting of the New England Branch of the American Urological Association, Boston, April 20, 1939. From the Urological Service of the Sacred Heart Hospital, Manchester, New Hampshire.
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view when he was able to find no demonstrable tuberculosis in some of the cases. In such patients, however, he found a concomitant prostatitis which could not be cured so long as the lesions were present. The lymphocystic bodies of Pelouze have been classified by Hinman midway between cysts and polyps. Because cystic degeneration of lymph follicles elsewhere in the body rarely, if

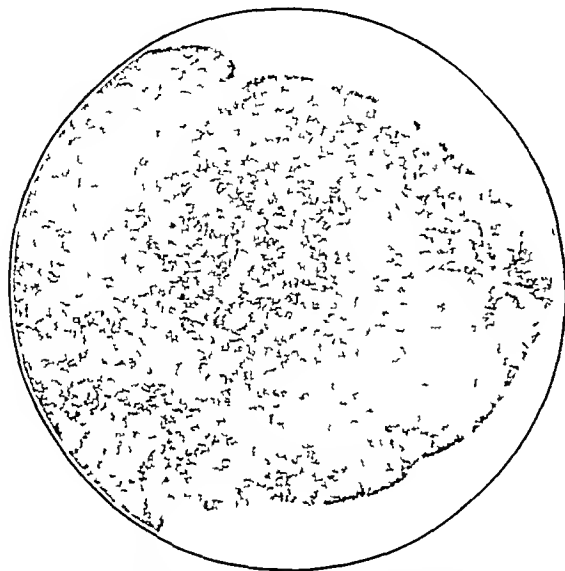


FIGURE 2 *Lymph Follicle in a Polypoid Mass Removed from the Prostatic Urethra in a Patient with a Profound Bacillary Infection*

ever, occurs, it does not seem proper to include them in the follicularis group.

Stirling⁶ recently added 4 cases of cystitis follicularis to the literature. One case was associated with cystitis cystica, cystitis glandularis and pyeloureteritis follicularis, and 1 exhibited cystitis follicularis and cystitis glandularis in the same specimen. In each case the urine was infected with colon bacilli.

True solitary lymph follicles have been found, then, in the renal pelvis, the ureter, the urinary bladder, the posterior urethra and the fossa navicularis.

Urethritis follicularis must be differentiated from the cystic, glandular and granular groups (with which it may, however, be associated), from true polyps, small fibromas or myomas which are probably not very common and from bullous edema. Because clinical differentiation may at times be difficult and because the lesion may have special significance in relation to associated pathologic lesions, exact diagnosis and therefore a rational therapeutic approach demand more frequent biopsies. Chronic infection, although not mentioned in every reported case presenting clinical

lymph follicles, appears to be an important factor.

Whether submucosal lymph follicles are normally present in the urinary tract has been a subject of considerable interest. Time does not permit a detailed discussion of this problem, which is ably presented by Busch, Kretschmer, Hinman and others. Lymph follicles have as yet not been reported in the urinary mucous membranes of infants. The manifestation of enlarged follicles in the presence of infection, however, would seem to point to the pre-existence of occult lymph tissue in the urinary mucous membranes, with perhaps in individual variation. Inasmuch as solitary lymph follicles occur in the mucous membranes of various other organs and because of the close embryological relation between the urinary tract and the alimentary tract, the absence of nodules appears



FIGURE 3 *Glandular Structures in a Polypoid Mass Removed from the Proximal Portion of the Urethra in a Woman*

The same specimen also showed two lymph follicles

more remarkable than does their presence. Their spontaneous disappearance from the bladder with the subsiding of infection has been reported. In this respect they do not differ greatly from the other proliferative lesions of the mucous membranes of the urinary tract. This phenomenon in each case suggests the necessary presence of a pre-clinical structure made manifest by the presence of infection. MacCallum,⁷ quoting Ribbert, points out that there are many scattered lymph follicles in the tissues which become evident only when they are caused to swell by some inflammatory reaction.

Not all patients with chronic genital or urinary

infection develop follicular manifestations. One or more additional coexisting factors must of necessity, therefore, be involved. Of these, a wide individual variation in the presence of submucosal lymphoid tissue in the urinary tract has been predicated as a most reasonable explanation. Recent experimental work with estrone in monkeys, while in no way refuting this theory, is of considerable interest.

Sandys and Zuckerman⁸ demonstrated small lymph nodules deep under the urethral epithelium in male rhesus monkeys, and showed that these nodules became manifest after the monkeys had been injected with estrone. The nodules increased in extent as long as the injections were given. Further studies on the relation of these follicles to hormonal influence and their possible relation to general and local defense mechanisms against infection and toxic products would be enlightening.

From available evidence I am led to look upon these follicles as secondary rather than primary manifestations of infection. Their presence therefore, whatever the associated symptomatology may be, should lead to a search for the primary cause, particularly in the urinary and the genital organs of both men and women. Being cognizant of the facts that lymphoid tissue is part of the body's defense mechanism against bacterial invasion and that the follicular nodules may be expected to disappear with the eradication of the primary source of infection, it would hardly seem logical to fulgurate them indiscriminately as polyps. If, however, by their location they interfere with the complete emptying of the bladder or are a source of irritation or disturbing hemorrhage, complete destruction with high frequency current would appear to be indicated.

SUMMARY

Microscopical study of polypoid masses removed from the posterior urethra of 3 women and 1 man showed the presence of true solitary lymph follicles in each case and associated glandular structures in 1.

Etiologically these nodules are apparently secondary to infection elsewhere in the genitourinary tract, although certain coexisting anatomical or physiological factors probably play an associated role.

A careful study of the genital and urinary tracts in both men and women, therefore, should precede any decision with regard to the relation of these follicular lesions to urinary signs and symptoms. This point of view should lead to a rational therapeutic approach.

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DISCUSSION

DR. E. GRANVILLE CRABTREE, Boston. I should like to ask Dr. Zimmerman if these cases are sufficiently differentiated for them to be distinguished from round-cell infiltration.

DR. ZIMMERMAN (closing). The differential point between true lymph follicles and round-cell infiltration is the germinal center. In each of the two sections shown there was a light central portion and a darker peripheral area. The lighter central area is the germinal center which is not present in round-cell infiltration.

REPORT ON MEDICAL PROGRESS

SYPHILIS

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SYPHILIS has been widely discussed in the past year as a result of the campaign of the United States Public Health Service, both in the medical and in the lay press, for its eradication. While only a few of these articles can be commented on, this publicity has resulted in wider discussion of the disease by the general public and greater familiarity with its manifestations and treatment. Numerous laws relating to syphilis have been enacted, some of them prematurely without due consideration of all phases of the question.

SYPHILIS AND PUBLIC HEALTH

At least forty-four states have either laws in effect or bills before their legislatures to create new laws or revise existing statutes. In Massachusetts a prenatal blood-test law became effective on November 1, 1939, and requires every physician to perform a serological test in every pregnancy.¹ The incidence of syphilis in pregnant women in various parts of the country in large clinics has been found to be from 2 to 4 per cent.² The fact that the loss from syphilitic blindness in the United States has been estimated at ten million dollars yearly³ is a potent argument for such laws.

Much has been written about these laws. Kolmer's⁴ article on premarital and prenatal tests for syphilis is a particularly good summary of the reasons for and against such tests for syphilis, and sums up with clarity the problem of the legal requirement of blood tests for syphilis during pregnancy and at delivery. The principle involved in the formulation of statutes for the control of syphilis has been thoroughly considered by Stokes and Ingraham,⁵ who have also discussed the matter of false positive serological tests occurring in syphilis. They emphasize that laws cannot justly put the sole or major dependence on any laboratory procedure. The proper interpretation of serological tests for syphilis is vital. A single negative report does not of itself rule out the disease, and a repeated checking of positive re-

ports in the absence of other confirmation is essential. A series of papers by Stokes,⁶ Snow,⁷ Nelson⁸ and Towne⁹ is a most comprehensive symposium on the social and public-health programs. Many phases of control, diagnosis and legal regulation are thoroughly discussed, while educational and co-operative measures are emphasized. The follow-up of the syphilitic patient is an essential feature of any program, because every early case may be a clue to a new localized outbreak, and sometimes a surprising number of infected individuals can be unearthed by adequate follow-up methods. This group of papers is most worthy of careful study by those interested in the problem.

It is worth mentioning that the fifth and sixth supplements¹⁰ of *Venereal Disease Information* are a useful help to the general practitioner in the handling of syphilis. These concise booklets should be regarded merely as a guide and not as a thorough dissertation on the subject matter.

In any attempt to develop statutory control of syphilis there are three essential features: first, an adequate educational campaign over a period of years to obtain the co-operation of physicians and the public; second, a preservation of the opportunity for individual medical interpretation by properly qualified physicians of the complex problems which arise; and third, the insistence on an adequate physical examination as well as on laboratory procedures.

EXPERIMENTAL RESEARCH

Perhaps the one outstanding advance of the year is the work of Eagle¹¹ on the in vitro effect of arsenic and bismuth compounds on *Treponema pallidum*. Years ago unsuccessful attempts had been made along this line. Eagle's success opens many vistas of perhaps startling advances. Time consuming animal experiments on the therapeutic activity of various drugs may possibly be replaced. More accurate information on the mode of action of drugs may be obtained. This work of Eagle has already been applied from the clinical standpoint by the successful use of arsphenaminized citrated blood in the prevention of transfusion syphilis.¹²

Turner and his associates¹³ report that some

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degree of protection is afforded by syphilitic human serum in experimental rabbit syphilis. This substantiates the occurrence of protective antibodies in the serum of human syphilitic patients. Becker¹⁴ has done similar work, utilizing a flocculate obtained from syphilitic human serum, and has shown that this material is antigenic. Landsteiner's haptene theory offers the best explanation of the mechanism involved, in Becker's opinion.

The massive therapy method has been pursued still further. This method of treatment, while holding a great deal of hope and promise, cannot be accepted until ten or fifteen years' observation bears out the results of a so far maximal period of five years' observation. Several European investigators using the technic have reported a high incidence of reactions. In this country the work of Chargin and Hyman¹⁵ and their collaborators seems to have been most carefully carried out and their results are more satisfactory than others reported, but complications are undesirably high in number. It should be emphasized that this type of therapy is still in an experimental stage. It is unsuitable for mass application and probably always will be.

DIAGNOSIS

An advance in the laboratory diagnosis of syphilis has been made in the development by Krajian¹⁶ of a staining method for *Treponema pallidum* in tissue sections. This stain for smears containing the organism had been previously reported and has had a wide clinical application. The frozen-section method has some advantages over the dark field and smear-stain methods, but it involves a delicate technic.

SEROLOGY

There has been further search for a more rapid serological technic. Many reports¹⁷ have appeared concerning the use of the Laugblen test for syphilis, which is comparatively new and rapid, but there is considerable disagreement in the reports. This method deserves further study.

Standard procedures should be employed until there has been wide experience with new methods. Comparative studies of the merits of already established serological procedures continue to be reported. The value of routine employment of a very sensitive flocculation or precipitation test, checked by a less sensitive but sometimes more specific complement fixation method, has been emphasized by Tuft and Richter¹⁸ in reviewing the Kline, Kahn and Kolmer methods.

Clinical confirmation of various serological procedures has been subjected to further study. Crawford and Ray¹⁹ have reviewed a large series of

serological discrepancies, and point out that a persistently positive Hinton test, even though unaccompanied by a positive Wassermann reaction, may be considered diagnostic of syphilis. When exhaustively studied 50 per cent of the cases in this large group were found to exhibit other evidence of syphilis. Serological discrepancies are continually arising and need further extensive study. It is important that in questionable cases there be repeated retesting of blood by several methods in different laboratories and searching physical examination. The question of false positives arises, but the temporary occurrence of a reagin-like substance has rarely been found in the blood of some otherwise normal individuals.²⁰ Various bacterial diseases other than syphilis and certain noninfectious diseases may give rise to this situation.²¹ Infectious mononucleosis has been found to give an occasional false positive.²² Further evidence has appeared which verifies previous assertions that malarial infections may cause a temporarily positive Wassermann or Kahn reaction.²³ It is possible that a solution of these enigmas lies in a more extensive application of quantitative serological methods. Kahn²⁴ cites many advantages of such a procedure. It is to be emphasized that an ordinary qualitative test reported as "++++" means nothing except that it is positive, giving no quantitative information.

Whether a negative Hinton test rules out neurosyphilis in the absence of clinical evidence and thus obviates the necessity of spinal puncture is still a controversial point according to Hazen,²⁵ who states that from 15 to 20 per cent of cases of neurosyphilis will be found to have a negative blood serological test even with the most delicate methods. The Davies-Hinton reaction performed on spinal fluid is reported by Marquis²⁶ and Brenner and Merritt²⁷ to have a higher degree of specificity and sensitivity than has the Wassermann test. Further study is indicated, and meanwhile both tests should be continued on spinal fluid specimens.

CLINICAL PROBLEMS

Late asymptomatic syphilis has been emphasized by a number of studies during the past year. The prognosis of the so-called latent group was reviewed by Morgan²⁸ who found that life expectancy is shortened approximately 17 per cent in these patients. The amount of activity found to occur subsequent to the diagnosis of latent syphilis was said by this author to be 25 to 35 per cent. Adequate treatment of this group of syphilitic patients reduces the morbidity to 5 per cent. Even if the figures quoted by Morgan are a little higher than might be expected by some

authorities, they should serve as a warning to those who would summarily dismiss asymptomatic late syphilis. O'Leary²⁹ in a review of latent syphilis emphasizes the fact that adequate treatment in the early stages would prevent the appearance of incapacitating or death-dealing complications in 98 per cent of patients. The present incidence of 60 per cent asymptomatic syphilis would thus be theoretically reduced to 2 per cent. The point should be brought out here that the continuation of O'Leary's "permanent latency" will not be maintained by the patient's self-generated resistance in some cases. A short course of bismuth once or twice yearly will obviate trouble in practically all cases.

Beckh and Kulchar³⁰ state that too long usage of any one drug may be partially to blame for resistance to treatment. They also found that the simultaneous use of two drugs seems to contribute to treatment resistance, perhaps owing to underdosage with the arsphenamines.

SYPHILIS AND TUBERCULOSIS

A number of articles have appeared in regard to coexistent syphilis and pulmonary tuberculosis. An analysis of the more recent reports seems to indicate that the two diseases can occur in the same patient without undue exaggeration of either, except in the Negro. Patients with pulmonary tuberculosis appear to tolerate anti-syphilitic therapy as well as nontuberculous individuals. The effect of tuberculosis on the serological reactions for syphilis has been a rather controversial point for some years. Parran and Emerson³¹ state that tuberculous toxemia may contribute a confusing factor to the serological study of syphilis, but should not present a major problem in the clinical interpretation of results obtained with carefully conducted serodiagnostic procedures.

CARDIOVASCULAR SYPHILIS

Recent studies indicate a gradual diminution in cardiovascular syphilis. Welty³² reports the clinical and pathological records of 15 000 consecutive postmortems over a ten-year period. His figures bear out the impression of both the decrease in incidence of cardiovascular syphilis and its lessening importance as a cause of death. A study by Thompson, Comeau and White³³ of syphilis of fifteen to twenty-five years' duration revealed only 7 per cent of cases as having definitely demonstrable cardiovascular syphilis. None of the cases having had even a minimum of adequate therapy were among the 7 per cent with cardiac damage. This supports the value of therapy in the prevention of cardiac syphilis.

NEUROSYPHILIS

A concise review of the treatment of neurosyphilis by Merritt³⁴ is a partial guide for the general practitioner. Kopp and Solomon³⁵ studied the malarial treatment of 302 cases of general paresis. The best clinical results were obtained in those patients who received one hundred and fifty hours or more of temperature exceeding 100°F rather than extremely high temperatures. Patients receiving more than ten paroxysms obtained better clinical results than did those with less.

Observations indicate that the prognosis in paralytica dementia is strongly influenced by the personality pattern. The schizophrenic type should be viewed as of very grave prognostic significance.³⁶ Patients in the delirious, apathetic and agitated groups have the best prognosis, especially those with a well-integrated preparalytic personality.³⁷

Thiamin chloride has been found useful for certain cases of lightning pains in tabes dorsalis. Metildi³⁸ treated a small series of cases with parenteral injections of this drug at weekly intervals. It has been our experience, however, and that of O'Leary³⁹ that very large daily intravenous doses are usually necessary to produce results.

SYPHILIS IN PREGNANCY

A rather harsh criticism of the routine therapy generally accepted for pregnant syphilitic women has been made by Ingraham,⁴⁰ who questions so much active arsenical therapy during pregnancy. Naturally any physician will give full consideration to the physical condition of the individual woman patient in planning treatment for the remainder of the pregnancy, and will weigh carefully the risks of treatment and the possibility of a syphilitic child. Moore⁴¹ in commenting on this paper points out that bismuth alone has not succeeded in preventing congenital syphilis, and that the abandonment of arsenical therapy during pregnancy would most certainly increase the incidence of congenital syphilis.

CONGENITAL SYPHILIS

A most excellent treatise on the diagnosis of congenital syphilis by Black⁴² is well worth reading in toto. Clear tables illustrate the essential pathognomonic criteria. The vital necessity of diagnosing congenital syphilis at the earliest possible time in life and the institution of effective treatment as soon as the diagnosis is established are emphasized. No treatment should be given without an absolute diagnosis, and if the child of a syphilitic mother gives negative reactions the follow-up should continue over a period of years.

in all cases. Offspring of syphilitic women may exhibit no diagnostic evidence of any sort until the age of five years or later. This author also strongly advises lumbar punctures in all congenital syphilitic patients. Hinsie⁴³ reports on neurosyphilis in children, and quotes the striking incidence of 33 per cent positive spinal-fluid findings when routine lumbar punctures were done on congenital syphilitic patients with positive serological blood tests.

The ocular manifestations of congenital syphilis are reviewed by Kahn⁴⁴ and McLeod⁴⁵. The former states that the eye is more frequently affected than is any other organ in congenital syphilis and that there is a higher percentage of ocular lesions than of positive blood serological findings. A report by Klauder and Cowen⁴⁶ on corneal examination by slit lamp microscopy in the diagnosis of late congenital syphilis is of considerable interest. Its use is essentially restricted to ophthalmologists.

Several reports on the treatment of congenital syphilis bear out the importance of full therapeutic doses in accordance with weight rather than age, and the usefulness of therapy even in older congenital syphilitic patients. Acetarsone is not finding as much favor as formerly, later reports indicate less satisfactory results and higher morbidity, due to complications and reactions, than was originally hoped.

THERAPY

Although new preparations of arsenic continue to be studied, it seems that bismuth is at present in the foreground of the investigative field. Reports on toxicity, absorption, excretion, retention and therapeutic activity coincide with previously accepted knowledge of the various bismuth compounds. A simplified technic for administering old arsphenamine is reported by Cannon⁴⁷. It is useful for those employing this drug in office practice. A similar technic has been used for many years at the Massachusetts General Hospital.

Acetarsone has been studied further by Pillsbury and Perlman⁴⁸. The effect of this drug in arresting congenital syphilis is inferior to arsphenamine and bismuth preparations, and the incidence of reactions is high. This drug cannot be experimentally controlled in regard to toxicity or effectiveness as can the other arsenicals. One cannot be sure that patients are taking their medication as directed. This objection applies to any oral treatment of syphilis. Robinson and Robinson⁴⁹ report that Acetarsone is a dangerous drug. They state that it is definitely contraindicated for adults and also issue a warning about self medication.

Several papers have appeared in regard to the simultaneous use of arsenic and bismuth compounds. The bulk of opinion seems to be against this combined treatment. Disadvantages include higher risk of damage to the patient, slower reversal of serological tests⁵⁰ and a higher incidence of relapse. Beckb and Barnett⁵¹ support this attitude. They report almost four times as high a percentage of mucocutaneous relapses among cases treated with arsenic and bismuth simultaneously. The alternating continuous system therefore seems to be preferable.

Mention was made in last year's report of oral bismuth therapy in syphilis. Work along that line has been continued, and very recently further reports of the clinical application have appeared. It is believed that considerable caution should be exercised in the application of any oral treatment for syphilis. It will always be difficult, even with the most co-operative patient, to be certain that the prescribed dose of oral medication has been received. The patient will tend to stray farther from the influence of the physician, thus reducing the probability of co-operation. In the place where such therapy would be of the greatest economic value, namely the indigent population, oral medication would be without doubt the most abused. The results would be an inevitable increase in relapse and spread of the disease. We cannot know for many years the ultimate effect of any new type of medication for syphilis. A most serious danger to the public health is the possibility of self-treatment which oral therapy for syphilis is bound to encourage. Oral medication should be restricted to certain very narrow limitations, which might include patients unable to secure regular treatment by a physician, the occasional unusual patient who cannot tolerate intramuscular injections, perhaps some cases of cardiovascular syphilis and a few selected cases of congenital syphilis. A recent editorial⁵² gives a concise summary of this situation.

TREATMENT REACTIONS

Erythema of the ninth day has received considerable attention. It is now relatively well accepted^{53, 54} that this reaction is not a contraindication to the continuance of intravenous arsenicals, but a temporary reduction in the dosage is advocated. Complications of the ninth-day erythema, such as jaundice, prolonged dermatitis or hematologic disturbances, are a definite contraindication to arsenicals, at least for a considerable time after recovery. It is essential to differentiate this eruption from the early stages of exfoliative dermatitis. One case has been reported in association with bismuth therapy⁵⁵. It has also occurred following gold injections.

Gastric intolerance to the arsphenamines is discussed by Irgang⁵⁶ in a lengthy but interesting treatise. One warning seems essentially worth while. He states that any arsenical hepatitis not responding to three weeks of routine detoxication therapy should be watched with exceptional care, as this may presage yellow atrophy of the liver.

Post-arsphenamine jaundice was studied by Lane⁵⁷ in a review of 100 cases. The four factors of causal importance in this series were arsenic, syphilis, bacterial infections and bismuth. Bismuth appeared to be a precipitating factor to a larger degree than is usually expected. Soffer⁵⁸ reviewed all the reports of jaundice in the available literature. He found that 1 per cent of syphilitic patients develop jaundice. From 1 to 14 per cent of those having jaundice were reported to have developed yellow atrophy of the liver. This is a disturbing percentage. Cirrhosis of the liver may play a greater part than is generally realized. The use of cholagogues and cholaretics is held to be an unsound form of therapy.

Tryparsamide reactions have lately been reported. These include numerous nitritoid reactions, occasional dermatitis and a case of acute yellow atrophy of the liver. This drug until relatively recently was not known to cause any reaction other than damage to the optic nerve. A detailed and comprehensive review of the literature on tryparsamide was recently published by Hinrichsen.⁵⁹ It is assumed that there may have been an unnoticed deviation in the method of manufacture or possibly an unintended alteration in the basic materials used. These matters are being investigated.

Optic nerve damage from tryparsamide is being investigated by Muncy,⁶⁰ and he reports that the vitamin B complex seems to act as a preventive. This author has also used the vitamin B complex as a curative agent after tryparsamide damage has begun to appear; large doses should be used in these cases. Muncy believes that preparatory bolstering of the patient with the vitamin B complex before the use of tryparsamide is of considerable value.

Astrachan⁶¹ indicates that the administration of liver extract seems to help in preventing reactions of intolerance to arsenicals. It may be of some help in hastening recovery from the aftereffects of arsenic intolerance.

* * *

That definite progress is being made in the control of syphilis is indicated in a recent release of the United States Public Health Service.⁶² Not only have the facilities for diagnosis and treatment been greatly enlarged, but 60 per cent more persons have been brought under treatment than in the previous twelve months. Approximately

103,000 patients were discharged from clinics as cured or arrested, as compared with 78,000 in 1938. Such figures lend encouragement to the campaign against syphilis.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26061

PRESENTATION OF CASE

A sixty-year-old Italian barber was admitted complaining of severe epigastric pain.

Twenty years before he had been examined at an outside hospital for the question of peptic ulcer, but the diagnosis had not been established. He was well from then until six months before entry, when he began to complain of indigestion characterized by a sense of epigastric fullness. Two weeks before entry this symptom had become worse and for the first time he began to notice vague epigastric pains. Fourteen hours before being seen he had a sudden onset of severe, prostrating, epigastric pain. He vomited a small amount of material described as resembling coffee-grounds. His local physician was called and gave him some medicine in water to drink. This produced great accentuation of the abdominal pain. The doctor was called back again four hours later, at which time the patient was found in collapse. There was definite cyanosis, dyspnea and a weak thready pulse, and the blood pressure could not be obtained. The abdomen was somewhat distended, and was tender, particularly in the upper half, there was moderate spasm. The patient was referred to the hospital after he had been given two $\frac{1}{4}$ -gr doses of morphine.

Physical examination showed a well-developed and nourished man, who was cyanotic, with gasping respirations and a weak and thready radial pulse, markedly dehydrated and too ill to respond to questions. The heart sounds appeared normal, at about the rate of 110 beats a minute. The chest was clear to auscultation except for a few moist rales. The abdomen was moderately distended throughout. There was diffuse tenderness, most evident in the epigastrium and under the left costal margin. There was definite spasm of the entire epigastrium. Auscultation revealed no audible peristalsis. The flanks bulged somewhat, giving one the impression of fluid in the peritoneal cavity, the liver dullness was not obliterated. Rectal examination was negative. There was slight pitting edema of both ankles. The blood pressure was 60 systolic, 40 diastolic.

The temperature was 101°F .

The blood showed a red-cell count of 4,100,000

with 110 per cent hemoglobin, a white-cell count of 7400, and a normal differential.

X-ray examination in sitting posture revealed no air under the diaphragm and gave evidence of intestinal ileus because of one slightly dilated loop of small bowel containing a fluid level. The roentgenologist suggested that the radiance of the film was evidence of free fluid in the abdomen. There was also evidence of some fluid in the left pleural cavity. The patient's condition contraindicated exploration, particularly as no diagnosis could be arrived at. He was given a transfusion and Ochsnerized. Four hours later, examination showed the patient's condition to be somewhat worse. The abdomen was more distended and more spastic. The chest signs had changed remarkably, there being complete immobility of the left chest, with flatness to percussion and no breath sounds. Bronchial breathing, with increased fremitus, was heard at the right base. A chest tap through the left eighth interspace yielded a large amount of dirty brown fluid, which was odorless and was shown on smear to contain red blood cells in various stages of degeneration and amorphous yellow material presumed to be hemoglobin, a rare gram-positive diplococcus was seen. Six hours later the patient died.

DIFFERENTIAL DIAGNOSIS

DR. TRACY B. MALLORY. Once in a long interval it seems only fair to turn the tables and today they have given me a case to discuss from the clinical point of view. After reading the history I wondered why this case was chosen for me and tried to decide whether it was to be regarded as a manifestation of touching faith on the part of my colleagues or of a vindictiveness that I hate to contemplate.

We are faced here with the paradox of a man with a perfectly clear story of an abdominal catastrophe whose only unequivocal clinical findings seem to be in the thorax. If we take the story alone we have a man, who previously had been in good health except for the vaguest of prodromal symptoms, suddenly developing prostrating abdominal pain, who in a period of a few hours goes into shock. That immediately makes one think of a perforated viscus, possibly of acute hemorrhagic pancreatitis or of mesenteric thrombosis,—although the pain is repeatedly described as epigastric rather than abdominal,—and conceivably of aneurysm, although there is no mention of pain in the back. With the old history of a question of ulcer twenty years ago, with the vomiting of some material described as coffee-grounds,—we wish we could rely on that and that we had some objective evidence to confirm it,—one would

think first in terms of peptic ulcer, and strongly suspect perforation. We look for evidence of the development of general peritonitis and get suggestive evidence of it, but the signs and symptoms all remain localized in the upper part of the abdomen and in the epigastrium. Now sometimes clinical signs of peritonitis such as this indicate a peritonitis limited to the lesser omental cavity, and an ulcer might easily perforate into that, and he might not yet have a general peritonitis.

The question comes up whether this is true shock or possibly response to hemorrhage. It sounds to me rather more like a picture of shock. The cyanosis fits that better. The constantly maintained low blood pressure sounds like shock, as does the fact that several hours later he still had a hemoglobin of 110. His blood was apparently concentrating rather than showing evidence of anemia, which makes shock more likely than hemorrhage.

I cannot, however, think of any ordinary complication of gastric ulcer that could produce what we find later. We have the statement that when he was first seen the thorax was negative to auscultation. I think we probably have to take that with a grain of salt. The examiner was probably thinking of an abdominal condition, as I thought when I read to that point, and I do not rely on that observation. Moreover, at the time he came to the x-ray department they had already found that there was something in the thorax. On the next clinical examination the breath sounds were diminished. Soon they disappeared completely over the left chest, which became fixed, no longer showed respiratory movements and was flat to percussion. Eventually they tapped it and got off material that we are led to believe was indicative of old hemorrhage.

So we have to consider the possible thoracic lesions, and there are several, which produce the picture of shock and pain localized in the abdomen. Coronary thrombosis can certainly do it, but coronary thrombosis could not account for the fluid which was withdrawn on chest tap unless there was also a rupture of the heart and the pericardium was so distended that they succeeded in tapping it. This material which was withdrawn, if we are right in our assumption that it is blood showing evidence of disintegrative changes, must have been acted on by ferments in order to change its consistence and color. Blood in a serous cavity does not undergo this change for days, so that the assumption of a ruptured heart would force us to assume that the disease is of much longer duration than the history would indicate. That does not seem a satisfactory explanation. Infarcts of the heart do not perforate for a number of days,—four, in my experience, is about

the minimal time for them to occur,—and we have nothing to suggest that anything so severe as infarction of the heart occurred four days before the present illness. So I am inclined to rule out infarct of the heart and hemopericardium. Pulmonary embolus can produce shock. The story does not sound very much like it, but it can produce abdominal pain and it can produce pleural effusion which can be bloody, but again the time is too short for this to have become old, changed blood.

This seems to eliminate most of our possibilities except for the organs which pass from the thoracic into the abdominal cavity, and one certainly must think of the aorta. It is quite possible, I think, for a rupture of the aorta in the very low thoracic or upper abdominal region, bleeding perhaps into the leaves of the diaphragm, to result in blood in both the abdominal and pleural cavities simultaneously or one shortly after the other. We are without benefit of the results of serological tests, and sixty is a little late for a luetic aneurysm. So if it is rupture of the aorta, it is probably one due to senile ectasia or a deep atheromatous ulcer rather than to a syphilitic aneurysm.

There is one other possibility which certainly comes to mind. Every now and then the stomach is not in the abdominal cavity but in the thoracic cavity. That would explain most of the symptoms here. I think we should still have to assume a rupture of the stomach, the extravasation of material into the hernial sac would completely fill the pleural cavity and would also probably extend down into the lesser omental sac and account for the suggestive signs of peritonitis that we have there. Though that seems like a fanciful hypothesis, it would be my first guess. If there are some x-ray plates I should like to have Dr. Hampton show them before I finally commit my self.

Is that a fluid level on the left side?

DR. AUBREY O. HAMPTON: Yes.

DR. MALLORY: How high?

DR. HAMPTON: At the eleventh interspace posteriorly. It is more the shape of the fundus of the stomach than it is that of the small bowel.

DR. MALLORY: Can you tell where the level of the diaphragm is?

DR. HAMPTON: No. At the time of the x-ray examination he had extensive density in the left side of the chest which might have influenced the physical examination somewhat later on. He was turned on the left side, and the film was taken to show free air but none was seen. I do not believe the radiologist was justified in calling this a loop of the small bowel, its interpretation is

the most important thing. The fundus of the stomach is probably below the diaphragm.

DR MALLORY: I should probably listen to Dr Hampton but the quality of the plates is certainly very poor, and I will stick to my two previous diagnoses. I will put diaphragmatic hernia with rupture of a thoracic stomach first, and aneurysm as the second possibility.

DR HENRY NIGRO: I took care of this man, and I might say that when the aspiration was done the fluid did not look like anything that is often seen. It was neither pus nor clear fluid. They did examine a stained smear, and a couple of gram-positive diplococci were found. Dr Chapman saw him a few hours later, and after looking at this material, which had a dirty brown appearance, he thought of testing it with Töpfer's reagent. When that was complete it was evident that the fluid was gastric contents.

DR MALLORY: I meant to say that I wished this material, described as odorless, had been sniffed by Dr Richardson or someone in whose nasal sensorium I have complete confidence.

DR GRANTLEY W TAYLOR: Why would not carcinoma of the upper part of the stomach with perforation both ways account for the findings?

DR MALLORY: I think that is a good idea and should have been suggested.

DR ALLEN G BRAILEY: I should think perforation of a peptic ulcer through the diaphragm might be possible.

DR FRANCIS T HUNTER: I should like to emphasize the fact that I do not know of any way of turning hemoglobin into "amorphous yellow material." That description is misleading.

CLINICAL DIAGNOSIS

Rupture of peptic ulcer of esophagus

DR MALLORY'S DIAGNOSIS

Rupture of intrathoracic stomach

ANATOMICAL DIAGNOSIS

Rupture of peptic ulcer of esophagus

PATHOLOGICAL DISCUSSION

DR BENJAMIN CASTLEMAN: Here is the specimen that was removed at autopsy (Fig 1). There was no diaphragmatic hernia, but what had occurred was a perforation of a peptic ulcer of the lower end of the esophagus. It had perforated into the left pleural cavity, had dissected posteriorly and retroperitoneally down to the abdomen for a short distance and terminally into the peritoneal cavity. There were 2000 cc. of fluid in the left pleural cavity. Unfortunately, we have

not yet been able to get microscopic sections of the ulcer but it is most likely a peptic ulcer arising in ectopic gastric mucosa in the esophagus. This is the usual cause of these ulcers, although simple autodigestion is sometimes given as the explanation. Since peptic ulceration has a characteristic fibrinoid base it should be quite easy to recognize.



FIGURE 1 *Perforated Peptic Ulcer of Esophagus*

DR. EDWARD HAMLIN, JR: I should like to emphasize the sequence of events. The chest was essentially negative when the patient was first seen. Apparently what happened was that the mediastinal mass dissected retroperitoneally first, thus causing abdominal symptoms, and a few hours later ruptured into the left chest. The sequence of events was quite startling to say the least. So far as I can tell from the clinical and the pathological records there has been only one other esophageal perforation. That was the case of Dr Richardson's that was discussed at one of these conferences several years ago. It is apparently a relatively uncommon catastrophe. More often the ulcer penetrates into the aorta and the patient dies of hemorrhage.

DR. EARLE M. CHAPMAN I saw this patient, and while discussing the case with the house officer, after having been told all the clinical picture, he said "If this is an ulcer on the lower end of the esophagus that perforated, this fluid might be gastric contents." I thought it was an excellent idea, and so we did a gastric analysis and found combined acid present. We then made the diagnosis. Unfortunately, Dr. Mallory did not have that information beforehand.

CASE 26062

PRESENTATION OF CASE

A thirty-three year-old Italian laborer was admitted complaining of pain in the epigastrium.

Five years before admission the patient noticed a lump in the right pectoral region which gradually grew larger and finally painful. Two years before entry the mass was removed in an outside hospital. The pathological report, checked at this hospital, was "lymphosarcoma, lymphocytic type." Because pain persisted in the operative site the patient was referred to the Tumor Clinic where, during an eighteen month interval, he was given roentgen therapy over the region of the axilla. The pain was relieved, and a few smaller palpable nodes in the area disappeared. He received only 1200 r in all. Throughout this interval he remained in excellent general health and was able to continue work. During frequent follow up visits his chest remained clear and his physical examination negative, except for the finding of a small nodule in each axilla when last seen three months before admission. One month before entry, however, he felt a mass in the epigastrium after urination. Fourteen days before admission his house caught afire, he narrowly escaped death as he leaped down a flight of stairs to avoid the conflagration. He was excessively worried because of the loss of all his possessions, and two days later grew aware of a burning epigastric pain occurring daily before breakfast, relieved by drinking coffee and recurring a few hours after the evening meal when it was alleviated by "soda water." Throughout this latter illness he experienced no vomiting, weight loss, anorexia or black or tarry stools. Except for the fact that his brother had "ulcers," the patient's family, marital and past histories were negative.

Physical examination revealed a well-developed and nourished man who lay flat and quietly in bed. He was pale and complained of pain in the epigastrium and rectum. There were pea-sized shotty enlargements of the left axillary, the epitrochlear and the inguinal lymph nodes. The

heart and lungs were normal. The entire epigastrium was tender, but exquisitely so in the mid epigastrium. On inspiration a hard, round-edged spleen was felt to descend two to three finger breadths below the costal margin. There was a painful, tender rectal sphincter, but no fissure or other abnormality was observed to explain this finding. The blood pressure was 125 systolic, 60 diastolic.

The temperature was 100.6°F., the pulse 100, and the respirations 24.

Examination of the blood showed a red-cell count of 4,200,000 with 72 per cent hemoglobin, and a white-cell count of 4200 with 74 per cent polymorphonuclears, the smear was essentially negative. A stool specimen showed a + guaiac test. Gastric analyses, both before and after histamine, revealed no free acid and a total acid of only 5 units.

A gastrointestinal x ray series showed that the stomach was displaced to the right by a markedly enlarged spleen. The folds of the stomach, particularly those of the body close to the lesser curvature, were thickened. The remainder of the organ was negative. The duodenal cap showed no evidence of disease. There was no evidence of ulcer. Films of the chest showed a high diaphragm particularly on the left, apparently due to an enlarged spleen. There was no evidence of intrapulmonary disease.

The patient ran an elevated temperature, which ranged between 100 and 103°F., throughout his seven-day hospital stay. Four days after admission he suddenly developed a sharp, stabbing pain with exquisite tenderness in the left upper quadrant. The constant, mid-epigastric distress and tenderness remained unchanged, however. The white-cell count rose from 4000 to 7000. At 9:00 p.m., on the seventh hospital day, he was seized with another severe, now mid-epigastric, red hot poker like pain, distinct from that which remained in the left upper quadrant. He vomited a mouthful of fresh bright red blood and continued to retch, with much nausea, until he had brought up 400 cc. The patient was given morphine sulfate ($\frac{1}{4}$ gr., repeated fifteen minutes later) and a few swallows of sodium bicarbonate solution, both of which brought relief from vomiting and a diminution in pain. He sweated profusely, and the pulse became thin and irregular, at 150 beats per minute. One hour after the episode had started, his respirations became rapid, irregular, deep and gasping. This change became increasingly more pronounced, and a half hour later, or one and a half hours after the onset, respirations ceased.

DIFFERENTIAL DIAGNOSIS

DR. TRACY B. MALLORY I might say that the x-ray treatment was given here at this hospital. The original biopsy was done outside, but we saw the slides.

DR. ROBERT R. LINTON So you confirmed this diagnosis?

DR. MALLORY We apparently did.

DR. LINTON May I see the x-ray films?

DR. GEORGE W. HOLMES Normally the diaphragm is a little lower on the left than on the right. Here it is higher, and the space between the fundus of the stomach and the diaphragm is increased, all of which confirms the statement in the text that he had a mass in the left upper quadrant, probably an enlarged spleen. In the stomach there is a peculiar appearance of the mucosal pattern, extending from the cardiac orifice down along the lesser curvature. I should think that was definitely abnormal. One would like to have had further observations. Evidently the man who did the examination thought the appearance was abnormal and described it as a prominent fold. From these films I cannot say anything very definite about the pyloric end of the stomach. The sphincter looks all right, the cap looks all right. What could it be? Lymphoma could produce prominent mucosal folds and nothing else. That is a possibility. Gastritis could do it—local gastritis. I think varices in the stomach could do it. We have never seen, or at least I have never seen, varices in the stomach, we have looked for them, and we have had some cases that at autopsy were proved to have had them as a cause of hemorrhage. But if one did see them I should think they would look something like this.

DR. LINTON Was the esophagus examined for varices?

DR. HOLMES They do not state whether it was or not, but it is a routine procedure in our clinic.

DR. LINTON We have a man of thirty-three years of age who was admitted to the hospital because of pain in the epigastrium. Seven days after he was admitted he suddenly died, and it is up to me to explain the cause of his death. I believe that his exitus was due to hemorrhage, and I have to discover the origin of this hemorrhage. In reading over the history and physical examination, he presents two outstanding findings—hematemesis and splenomegaly. I am a little uncertain how much emphasis to place on the diagnosis of lymphosarcoma because the mass was a little unusual in location, especially without any other enlargement of the lymph nodes. By x-ray there is no enlargement of the mediastinal

glands, and I rather think that the treatment with 1200 r was a small dose. Is that right, Dr. Holmes?

DR. HOLMES Not if the diagnosis was correct.

DR. LINTON The mass that he noted in the epigastrium after urination I should gather was most likely the spleen that was felt on physical examination. The laboratory studies are not helpful. I should like to know whether a Hinton test was done. Since it was not included here, it probably is of no significance, but it is one of the possibilities that has to be considered. The gastric analysis is of interest in that he had no free hydrochloric acid even after histamine.

In reviewing the case we must consider the causes of hematemesis. I think that one can rule out any esophageal cause of hematemesis, such as varices, mediastinal growth or perhaps an aneurysm rupturing into the esophagus, because of the lack of evidence by x-ray and physical examination of disease in these structures. Passing on to the stomach and duodenum we have to consider ulcer and carcinoma, which I think are pretty well ruled out by the x-ray examination. There is also the possibility he had an abdominal aneurysm with rupture into the stomach, but there is no record that there was an expansile pulsation in the abdomen, so we can rule out that possibility. We do have an x-ray diagnosis of gastritis, and it is possible to have a severe degree of hematemesis from gastritis, so that I think that is a likely possibility—one which we should consider seriously. Another important cause of hematemesis is portal cirrhosis with splenomegaly, but I am not aware that one can get hematemesis from portal cirrhosis without esophageal varices. There are other rare conditions, such as the splenic vein thrombosis of Banti's disease, but again esophageal varices are necessary to explain hematemesis. There are certain other diseases, such as a primary blood dyscrasia, in which hematemesis is a possibility, but they are ruled out by the negative laboratory findings. I believe Hodgkin's disease and the various other forms of lymphoma are conditions which may cause hematemesis, though I am uncertain as to the mechanism. Syphilis is certainly to be considered in view of the fact that he had multiple, enlarged lymph nodes.

Did you find any record of the Hinton test, Dr. Means?

DR. J. H. MEANS This is very disturbing. The blood was taken, but the Pathology Laboratory did not report it!

DR. LINTON We have a young man with an enlarged spleen who had a sudden exitus from hemorrhage. I do not see how one can get away from the pathological report of lymphoma. It

is disturbing to me that there is no evidence of the disease on his admission to the hospital. I do not know whether splenomegaly alone can produce gastritis, but certainly gastritis can produce hematemesis, so I think we have to consider these two conditions, namely lymphoma and gastritis. Any other diagnosis would be mere guessing. In conclusion, since he had an enlarged spleen and a diagnosis of lymphosarcoma had been made on the mass removed from his right axilla, I must make lymphoma my primary diagnosis. I believe his bleeding came from the stomach and was most likely due to an acute gastritis.

DR. WYMAN RICHARDSON I think you have thrown out the diagnosis of thrombosis of the splenic vein too hastily. Why should he not have obstruction due to that or cirrhosis, and splenomegaly with gastric varices and hemorrhage from them?

DR. LINTON I think that is a possibility. The unusual thing to me about the whole affair from this point of view is that he had such severe pain with hematemesis. When a man has hematemesis from ruptured esophageal varices he usually does not have much pain. It was chiefly because of this I thought that his bleeding was not from varices.

DR. EDWARD B. BENEDICT Why had he not had perforation of the stomach?

DR. LINTON You do not see hemorrhage and perforation together.

DR. BENEDICT Not usually, but it is possible.

DR. LINTON Yes, but I have never happened to see it.

DR. FRANCIS T. HUNTER I never saw this man, but I do not believe there is much question but that he had lymphoma with infiltration of the stomach and probably a ruptured stomach and a ruptured spleen. He must have had a hole through the spleen, which was already infarcted, according to the story. I think you are going to find a lot of lesions in the left upper quadrant.

DR. LINTON An infarct is a good suggestion. Yet the white count is not in favor of lymphoma.

DR. HUNTER In lymphoma the white count can be anything.

CLINICAL DIAGNOSES

Lymphoblastoma, lymphocytic type.
Hematemesis

DR. LINTON'S DIAGNOSES

Lymphoma
Gastritis.
Hematemesis (from the stomach)

ANATOMICAL DIAGNOSES

Hodgkin's disease of spleen and retroperitoneal tissues

Infarction and ulceration of the spleen

Perforation of the stomach.

Fatal hemorrhage.

PATHOLOGICAL DISCUSSION

DR. MALLORY The postmortem examination showed a tremendously dilated stomach which was completely filled by a cast of blood clot over a foot in length. Unquestionably the hemorrhage was massive enough to be the immediate cause of death. On the lateral wall of the stomach near the cardia was a large jagged perforation which led into a corresponding hole in the spleen, which was several centimeters in depth. The spleen was greatly enlarged, weighing 1700 gm., and showed tumor nodules and multiple infarcts. Beneath the spleen in the region of the tail of the pancreas and throughout the retroperitoneal tissues was extensive tumor and this had infiltrated and completely occluded the splenic artery so that there was good reason for the infarction of the spleen. The mass had also infiltrated down as far as the left kidney which showed some invasion of the peripheral portion. Unquestionably the source of the terminal hemorrhage was the perforation of the stomach and bleeding from the spleen itself. What the mechanism of the perforation was, I feel less certain about. In the face of completely absent hydrochloric acid it is difficult to believe that it could have been a peptic ulcer, and the histology does not suggest it. I think it is more likely that the spleen became adherent to the stomach and that infarction of the spleen occurred and broke directly through the stomach wall. I should be inclined to trace it that way rather than from the stomach outward. We could discover no tumor in the stomach walls—only severe gastritis.

DR. MEANS There is a story of possible trauma ten or twelve days before death when he fell downstairs. I wonder if he injured his spleen at that time. A lymphomatous spleen is very easily traumatized. I remember one man with a huge leukemic spleen who squeezed it so hard one day that it ruptured and he died of hemorrhage. I wonder if he had a hematoma in the spleen in close approximation to the stomach.

DR. MALLORY I think that is possible. The lesion lay at the upper end of the spleen. The area was covered by the thoracic cage, however, so it could not be directly injured by trauma unless by contrecoup.

A PHYSICIAN Do we not have occasional

lymphomatous ulcers of the stomach with perforation and general peritonitis?

DR. MALLORY We have seen lymphomatous infiltration of the stomach with perforation, but here there is minimal evidence of involvement of the stomach itself. From the slides I cannot be certain there is any. The most surprising thing from the histological point of view is that the lesion was quite characteristic of Hodgkin's disease and in retrospect it is hard to believe that we could have called it lymphosarcoma. I wonder if we were not misquoted.

DR. MAURICE FREMONT-SMITH Why did it bleed so much if the splenic artery was occluded?

DR. MALLORY That is hard to answer, but massive hemorrhage is common following infarction and the presumption that a good deal of it had been retrograde from the veins seems to be the only explanation.

DR. GEORGE A. MARKS Was the splenic vein involved?

DR. MALLORY By pressure but not by tumor infiltration, as the artery was

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PHARMACOTHERAPY

THE criticism is valid that, while clinical diagnosis has advanced remarkably in the past quarter of a century, progress in medical treatment is lagging. Pharmacology, the scientific basis of therapeutics, has come to be considered by many to be of little practical value, and a number of schools have gone so far as to abolish their pharmacological departments.

Pharmacology, as established by Schmiedeberg and his pupils, is essentially a science dealing with the effects of chemical and biologic agents on normal animals and on surviving organs. Due to such systematic investigations of old and new drugs, critique invaded therapeutics for the first time, with the result that the majority of previ-

ously used medications were eliminated as useless. But great though it was, this contribution of experimental pharmacology was to a large extent limited. Often unjustified conclusions regarding the treatment of disease in man were drawn from observations on normal animals. After a half century of this sort of analytic activity, it is natural that the field became somewhat sterile and ceased to draw able and inspired workers.

Recently, however, there has seemed to be justification for the optimistic belief that what is considered by many a vicious circle in the development of pharmacology is actually the beginning of the second circle of a spiral—a form that scientific progress often takes. Among the developments important to this expected renaissance of pharmacotherapy are the advances in quantitative chemical, physiological and immunological methods applicable to men, the increasing opportunities to induce disorders and diseases in animals and the close co-operation between groups of investigators in allied fields. These developments make it possible systematically to advance the findings of the laboratory to the treatment of diseased animals and, eventually, of men. As a result more important therapeutic discoveries have been made during the past decade than ever before—discoveries which have forever eliminated therapeutic nihilism in medicine. Progress in infectious diseases, in nutritional deficiencies, in dysfunction of the glands of internal secretion and in nervous disorders are but a few of the therapeutic triumphs.

It is essential to appreciate, however, that not pharmacological laboratories alone but all departments of physical, biological and clinical sciences have played their roles in these discoveries. For example, there are at present more than two hundred pharmacotherapeutic investigations in progress at Harvard University, scattered throughout its various scientific departments. Such widespread activity calls for helpfulness and co-ordination by a group representing the diversified interests involved. In the distant past, universities were institutions composed of groups of thinkers working in close association, and the

segregated departments of today are the result of the material and technical developments of the past century. But new interests that cut across a number of departments call once more for close personal association. It is significant, therefore, that President Conant has recently appointed a University Committee for Pharmacotherapy. It is hoped that, as a result of the activity of this committee, clinical and scientific interests will be brought closer together, pharmacotherapeutic investigations will be better guided, teaching of pharmacology and therapeutics will improve, post-graduate education in this diversified field will be fostered, and co-operation between the investigators in academic and industrial fields will be promoted.

Able students frequently enter surgery because they feel they can do more for the patient. The recent, rapid developments in pharmacotherapy should convince students that clinical medicine also offers great opportunities for treatment. Here there opens up a highly specialized field where physicians must use therapeutic agents which are often more effective and more dangerous than the scalpel. Pharmacotherapy may be considered by medical historians of the future as one of the most significant developments in the history of medicine in the twentieth century.

PATHOLOGICAL SERVICE FOR THE SMALL HOSPITAL

With the increasing complexity of diagnostic procedures, the wider recognition of the advantages that the pathological laboratory can afford the clinician and the higher standards for approved hospitals, there has been an increased demand for pathologists. So far as the large centers are concerned, this can be readily met, but in the small and relatively isolated hospitals, it is a very definite problem. Rarely is the size of the hospital large enough to support a full-time pathologist, and about the only feasible plan has been the grouping of a number of hospitals together to utilize the services of a single pathologist.

Recognizing that a number of the small hos-

pitals away from the large medical centers have difficulty in arranging for pathological service, the New England Pathological Society has established a committee with the hope of giving impartial advice to hospitals interested in establishing pathological laboratories and of bringing together competent men desiring positions and hospitals desiring pathologists. A letter in this issue of the *Journal* calls attention to the plan. The committee is now endeavoring to aid a group of three small hospitals with their laboratory problems.

Should the present plan work out successfully, it may point the way for a more effective utilization of the help that laboratory procedures can give in diagnosis and treatment.

MEDICAL EPONYM

BANTI'S DISEASE

Guido Banti (1852-1927), professor of pathological anatomy of the medical faculty of the University of Florence, Italy, published his first account of the disease which bears his name in *La semaine médicale* (14 318, 1894). It is entitled "La splénomégalie avec cirrhose du foie." The original Italian draft of this article appeared a month later in *Lo sperimentale, sezione biologica* (48 447-452, 1894), with due credit to the French journal. An English translation appeared in the English edition of *La semaine médicale* (2 364, 1894). The following quotation is from the English version.

In 1882, my attention was directed to the existence of a symptomatic and anatomic-pathological complex which, so far as I am aware, has never been described, and which may well be considered as a special kind of disease, namely, *splenomegaly with cirrhosis of the liver*.

The symptoms of the disease may be divided into three groups, corresponding to as many periods, viz. the *prae-ascitic* stage, the *ascitic* stage, and an *intermediate* stage.

The symptoms of the *prae-ascitic* stage are tumefaction of the spleen and anaemia.

In the cases with which I have had to deal, the *prae-ascitic* stage varied in duration from one year to four years and a half.

The *intermediate* stage is characterized by the appearance of dyspnoea, intestinal disorders, and sometimes haemorrhoids. This stage lasts a few months.

In the *ascitic* stage a liquid effusion takes place into the peritoneum. The anaemic symptoms become more and more marked, but the examination of the blood continues to give evidence of a normal number of leucocytes. This stage lasts from seven to eight months and ends in death.

OBITUARY

FREDERICK HENRY THOMPSON

1844 - 1939

In the December 21 issue of the *Journal* the death of Dr Frederick H Thompson, of Fitchburg, at the age of ninety five years and four months, was recorded.

He had the distinction of being the oldest living alumnus of Harvard Medical School, and also the oldest living member of the Massachusetts Medical Society, having joined in 1870. Even after giving up active participation in the affairs of the Society in 1920, he kept in touch with local medical affairs during the later years of his life.

He was well qualified for medical practice by graduation from Harvard Medical School and an internship at the Massachusetts General Hospital. After the completion of his hospital training, Lancaster welcomed Dr Thompson as the community doctor and physician to the Massachusetts Industrial School for Girls, where he established a reputation for sound practice.

His studies and service at the Massachusetts General Hospital under the direction of the prominent surgeons of that era had fostered an ambition to make surgery the major interest of his professional career, and in looking for greater opportunities, the growing city of Fitchburg presented attractive possibilities in this direction for which Lancaster could not compete, so after four years he moved to the larger community and soon became recognized as a valuable factor in the professional and civic life of that city. Practically all the important educational and cultural organizations of Fitchburg sought his support, which was freely given, although his major interest was always centered in medicine. Appointments to various official positions followed, among which were assistant surgeon and, later, surgeon of the 10th Regiment of the Massachusetts National Guard, secretary-treasurer and president of the Fitchburg Medical Society for Medical Improvement, orator, lecturer and president of the Worcester North District Medical Society, corresponding secretary of the Massachusetts Medico-Legal Society, two appointments as medical examiner of the third district of Worcester County, member of the Board of Directors, member of the United States Pension Examining Board, vice president and councilor of the Massachusetts Medical Society and delegate to the House of Delegates of the American Medical Association in 1911 and 1912. During the

World War, Dr Thompson served as chairman of the Selection Service Board of the 14th Massachusetts District, as captain surgeon of the Massachusetts National Guard and as a member of the Medical Reserve Corps. To this long list, other official city positions could be added.

Perhaps his longest and most concentrated interest was the Burbank Hospital. He was associated with its founding in 1891 and had served as a trustee and as a member of the staff, first as an active member and later as a surgical consultant. His influence in these positions was always of first importance in the growth of the hospital.

Here is presented a partial record of a busy and useful life of service which has inspired many tributes of affection and appreciation by his city and state. Those who were privileged to know him intimately profited by his sincerity and by his loyalty to high ideals and energy, which combined to establish qualities of leadership that brought success to his undertakings.

The history of Fitchburg will preserve the records of the accomplishments of this loyal and devoted citizen through all time, and his example will stand as an inspiration to those on whom his mantle has fallen.

W P B

MASSACHUSETTS MEDICAL SOCIETY

SHATTUCK LECTURE

The Shattuck Lecture will be given, as usual, following the annual dinner on May 21, and the Society has been extremely fortunate in obtaining Dr Ernest W Goodpasture as the speaker. The provisional title of the address is "Immunity to Virus Infections. Some theoretical and practical considerations," and Dr Goodpasture is eminently qualified to discuss the subject, since for many years he has been an outstanding contributor to the various problems associated with virus infections.

From 1915 to 1922, Dr Goodpasture was a member of the Department of Pathology at the Harvard Medical School, being assistant professor the last three years, and from 1922 to 1924 was director of the Singer Memorial Research Laboratory in Pittsburgh. In 1924 he was made professor of pathology at Vanderbilt University School of Medicine in Nashville, Tennessee, which position he now holds.

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

PUERPERAL SEPSIS FOLLOWING LOW-FORCEPS DELIVERY

Mrs. J. R., a thirty-four-year-old primipara, entered the hospital on July 6, 1914, when approximately thirty-seven weeks pregnant, because of a systolic blood pressure of 190, edema and a large trace of albumin in the urine. She started in labor spontaneously on July 16 subsequent to premature rupture of the membranes, and was delivered of a stillborn child on July 17 by a simple low-forceps operation.

The family history was not recorded. The patient had had the usual children's diseases and one rather serious period of melancholia which lasted six weeks. Catamenia were regular, having begun at fourteen, with a twenty-eight-day cycle. The last period was October 23, 1913, making the expected date of confinement August 3.

Physical examination at the beginning of pregnancy showed a well-developed and nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The blood pressure was 104 systolic, 60 diastolic, where it remained until July 1, when it was 134 systolic, 70 diastolic. On July 6 the urine showed a large trace of albumin and the blood pressure was 180 systolic, 100 diastolic, there was a great deal of edema. She was sent to the hospital, kept in bed and placed on a restricted fluid intake. Prior to delivery, the signs of toxemia cleared up, the blood pressure dropping to 130 systolic, 90 diastolic, and the urine containing only a very small amount of albumin.

On the morning of July 19, two days after delivery, the temperature was 99.2°F, and the pulse 84, the afternoon temperature was 100.6, the pulse 100, the uterus was larger than normal but not tender. On July 20 the temperature was 99.6°F in the morning and 100.4 in the afternoon. On July 21 the temperature was 99.2°F in the morning and 100.2 in the afternoon. On July 22, five days after delivery, the patient had a chill, following which the temperature rose to 102.0°F, and the pulse to 96. In view of the fact that the uterus was still large, the cervix was dilated, with the escape of a considerable amount of

foul-smelling, thick, dark-brown lochia, and the uterus was curetted and washed out with a small amount of warm salt solution. Following this maneuver, the temperature rose to 103.0°F, and the pulse to 120. The following day, July 23, the temperature was 100.2°F in the morning and 101.0 in the afternoon. On July 25, two and a half days after the uterus had been curetted, the patient had a chill lasting ten minutes, the temperature rose to 104.0°F, and the pulse to 140. The following morning the temperature had dropped to 99.2°F, and the pulse to 90, but another chill sent the temperature to 104.0 and the pulse to 140. On July 27 she had a chill in the afternoon, with a temperature of 104.0°F and a pulse of 120.

The temperature continued to be of the picket fence type for about ten days, when it came down to normal and remained there. She was discharged on August 16, one month after delivery.

Comment. It is impossible to be sure that intrauterine manipulation following a temperature for several days was the direct cause of precipitating a minor infection into a serious one, nevertheless such was probably the case. The patient was much sicker after the uterus had been curetted and washed out than she had been before. No cultures of the uterus were taken, nor were any blood cultures, no blood studies were made. The handling of this case was typical of that in vogue twenty-five years ago. The presence of the persistent low-grade temperature immediately after delivery until the chill on the fifth day is definite evidence of uterine infection starting soon after delivery. Today uterine cultures and blood cultures would have been taken, ice would have been applied to the fundus, some form of ergot would have been given to stimulate uterine drainage, but the uterus would never have been invaded. However, the patient was treated entirely conservatively after the initial mistake. It is quite fair to infer that if the uterus had been left alone, convalescence would have been much shorter, uterine trauma undoubtedly spread the infection.

This case also illustrates the successful treatment of toxemia occurring rather precipitantly late in pregnancy. Rest in bed and a restricted fluid intake were the essence of the treatment.

REPORT OF THE COMMITTEE ON INDUSTRIAL HEALTH

HEALTH SERVICE IN INDUSTRY

An industrial medical service in order to justify its existence must accomplish the following objectives

- (1) It must by means of physical examinations assist

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

the employment department in the placement of applicants and in the weeding out of the very few who may be unfit for employment.

(2) It must co-operate with the safety engineer in making safe the plant and all its machinery and processes so that they may not constitute a source of injury or disease to any employee.

(3) It must furnish early and efficient care of industrial injuries, having in mind the welfare of the employee, the easing of his pain and the bringing about of his early return to work and full earning capacity.

(4) It must make the employee's working hours safe by giving him good healthful surroundings, good medical advice and protection from others who may have defects or disease which would constitute a menace to him.

(5) It should provide, so far as it is within the province of industry reasonable protection from loss as a result of sickness or injury.

(6) It must co-operate with local public-health agencies, physicians and hospitals in carrying out the general community health program.

(7) It should maintain at all times strictly ethical and friendly relations with the family physicians of employees.

(8) It must be so conducted that the industrial physician always maintains with the employee the strictly confidential relation which traditionally exists between doctor and patient.

Health service in industry did not have its beginning in as comprehensive a program as this but even the least pretentious program today is attempting to live up to these requirements.

Facilities for the care of injuries today in our industrial plants are not considered adequate unless they are immediately available. A first-aid room with a nurse in charge may be adequate in some of the small plants but all cases requiring more than first aid should be cared for by a physician. The physician may be the family doctor or a physician employed by the plant. In the large factories the great number of daily treatments necessary call for the employment of a full-time doctor.

The first step in this program is concerned with the choice of healthy employees by means of physical examinations at the time of employment. This examination should accomplish the following ends: first, place the man on the job for which he is physically fitted; second, protect the person already employed from the entrance into the plant of others who might have transmittable disease or who by some serious physical defect might constitute a menace if given employment; third, the discovery of remediable defects and the giving of helpful advice aimed toward their correction.

The second requirement in the establishment of a well-rounded program, according to the standards enumerated above, has to do with the bringing about of safe working conditions. This is a work which can be carried out in any plant whether or not that plant has a medical department. The trained safety engineer has by his excellent work in so many of our industries built himself a lasting monument in the reduction of accidents and the saving of lives. It is probably no exaggeration to say that most operations have now been made so safe that the majority of accidents now occurring are due to the faulty human element involved. The injured workman or some careless fellow workman is frequently the cause of the accident. This

weakness must not be overlooked. The employees must be educated in safe practices in all their activities, and this educational process is a logical function of the medical department as well as of the safety department. Recounting of the many ways in which these safety measures have been consummated is not necessary now but some of the devices are worthy of mention. These are automatic brakes on revolving machinery guards over gears and moving parts, hand guards to prevent hands and fingers from entering the danger zone, hard toes for shoes to prevent injury from falling objects, automatic gates on elevators, exhaust ventilation for the removal of dust and fumes, establishment of safety zones by the efficient layout of traffic lanes, and many others just as important.

Frequent visits of inspection to all departments of the factory are essential to a successful health program of this type. The alert doctor can observe any infraction of the rules of safety and health and also at first hand see that his safety recommendations have been carried out.

Dust which contains silica in considerable quantity may constitute a hazard, and constant supervision of handling methods is necessary. Adequate exhaust ventilation and the use of respirators will as a rule prevent silicosis in the dusty trades, but only if someone makes it his job to see that these protective devices are used. There may be other hazards which cannot be guarded against by the methods above mentioned. Toxic materials and harmful dusts may constitute a definite hazard in some plants. It is the duty of physicians in these factories to know what materials are used and to determine their toxicity. It may in some instances be possible to substitute materials that are not toxic. When this is not possible, the physician must devise methods of protection. He should by careful periodic examination of individuals exposed discover the earliest signs of harmful effect from any of these substances. Lead and benzol are materials of this type. There are of course many others.

The third requirement in this health program provides for the immediate care of the injured employee and can best be carried out by having a hospital or dispensary centrally located in the factory and made easily accessible to all employees. This should be so equipped as to be capable of caring for the most severe injury so far as first aid is concerned, and also for the continued care of all ambulatory cases. It is assumed of course that these treatments are made under adequate medical supervision. This medical supervision may be by a local practicing physician spending part time in the plant or by a physician devoting full time to the work.

The industrial physician will keep up to date on all the latest developments of medicine which pertain to his plant. Also the wise industrial physician will provide himself with a goodly number of consultants and hospitals in whose hands he can place those cases which he is not equipped to handle. In choosing these consultants and hospitals he will invariably pick the best, and as a consequence the industrial employee is provided with the finest medical service obtainable. This type of service should be provided by industry not from the standpoint of good economics alone, but from a real interest in the welfare of the workers. Most industrial workers appreciate this fact and have come to look upon such service as a matter of right. They enjoy these benefits and are appreciative of them.

The medical and surgical care of these injuries calls for a thorough knowledge of the plant set-up on the part of the physician who is responsible for this service. He must know how the injury occurred in order to assist the safety department to guard against its recurrence.

He must know the physical requirements of each injured employee's job so that he may return him to productive work as soon as he is able to do so. Much economic loss may be prevented if he does this part of his job well.

The fifth step of the program has to do with protection from financial loss due to sickness and injury. It is not very far back to the time when the worker was not compensated for his injuries unless they were due to neglect on the part of the employer, and then it was often necessary for him to sue at common law in order to obtain compensation. The advent of the Workmen's Compensation Law and its acceptance by most industries have eliminated that trouble, and now employees are usually compensated without litigation, regardless of who is to blame for the injury.

There is much more time lost from work because of non-industrial sickness and non-industrial accident than as a result of industrial accidents. This also calls for some type of protection for the employee against financial loss. Mutual benefit plans, non-contributory benefit plans entirely financed by the employer and contributory group-insurance plans are those commonly resorted to at present. Mutual benefit plans are functioning well in some plants and may be the plan of choice for a particular group. This plan has the advantage of giving the employees a direct interest in the management of it. A contributory plan, such as is furnished by group-health and accident insurance, fulfills the requirements and is not apt to be discontinued because of lack of funds to carry it on. In this type of insurance the employer can still share part of the cost. A popular group-insurance plan today provides weekly indemnity in the event of sickness or non-industrial accident, usually for a maximum period of thirteen weeks for any one disability. There is a waiting period of one week before benefits begin, so that no disability short of eight days receives payment. A life insurance policy may be issued in combination with the weekly indemnity. This type is usually underwritten by an insurance company but in many cases the administration of it is a function of the medical department.

Any of these plans call for investigation of absenteeism by the medical department. Probably the best investigator of absentees is a trained nurse who is usually well known to all employees and is well received when she visits their homes. Being well trained to recognize illness and need, she is able to help in obtaining proper medical assistance for the patient by co-operating with the family physician or other interested agencies. The majority of employees accept this investigation at its true value and desire its continuance.

There can be no doubt in the minds of anyone as to the value of such insurance. Those who are close to the factory worker and his financial problems know what a staggering blow is dealt by an extended absence from work, especially when the disabled one is the head of a family. Not only has he the expense of medical care but he must find in addition a way to provide his family with the necessities of life while he is cut off from his earnings. Provision must be made to reimburse, in part at least, the disabled employee. The question is often asked whether or not employees take advantage of a plan like this to take vacations with pay. It is true that an occasional one may malingering, but there is nothing gained by penalizing the majority for the misdemeanors of the few. All plans have flaws and if the opportunity to malingering is the flaw in this type of insurance it still fulfills its purpose. It should be continued until something better offers.

The sixth requirement of the medical department in industry is co-operation with existing outside agencies,

family physicians, boards of health and welfare organizations. Though the physician is doing much for the worker through industrial health programs he has not replaced these other agencies. He has merely augmented their services and is not self-sufficient. The family doctor just as necessary to employees to whom this service is available as he was before. He is even more necessary, because industrial medical service has educated employees to take better care of their health and has encouraged them to seek the aid of their family doctors for conditions which they had been accustomed to ignore.

The industrial physician has an opportunity to do a real service to the community in his work along the lines of preventive medical care. The early discovery of communicable disease and the use of all known methods for its control are two of the principal functions of an industrial medical department. In protecting employees from exposure to them he is also protecting the community. The next great step in the fight against tuberculosis may possibly be made through the co-operation of industry and the departments of public health. Great work has been done in the young age groups in the public schools but less among employed groups by public-health agencies. The doctors in industry can be of help by adopting in the factories the same methods which have accomplished so much among the young groups. Through their industrial clinics they should be able to assist greatly in the continuation of this program.

This in general is the aim of most industrial medical departments, some giving service beyond that set forth here and some giving much less. The industrial physicians who are responsible for this service, however, must be well trained and especially familiar with occupational hazards and the general practice of safety and must not lose sight of the fact that no matter how large their organizations may be the confidential relation of physician and patient must be maintained.

W. IRVING CLARK, M.D., *Chairman*,
LOUIS R. DANIELS, M.D.,
NOEL G. MONROE, M.D.,
HALSTEAD MURRAY, M.D.

DEATHS

HILLARD—JAMES P. HILLARD, M.D., of Springfield, died January 29. He was in his sixty-third year.

Born in Fall River, he received his degree from Jefferson Medical College of Philadelphia in 1903, and had practiced in Springfield for thirty-seven years. Dr. Hillard was examiner for the Bureau of Pensions, Department of the Interior, and for the Travelers Insurance Company. For thirty-three years he was medical inspector in the public schools of Springfield and had served as physician for the Police and Fire departments.

He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, a brother, a niece and a nephew survive him.

KITTREDGE—JOSEPH KITTREDGE, M.D., of North Andover, died January 31. He was in his eighty-third year.

Dr. Kittredge received his degree from the Harvard Medical School in 1880 and practiced medicine in Brookline and Marblehead until 1918 when he retired to run his own sanatorium. He was the eighth in a nine-generation family of doctors.

He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow a brother two sons and a daughter Dr Edwina Kittredge Newberry survive him.

PAYNE—JAMES H. PAYNE M.D., of Allston, died January 31. He was in his seventy-eight year.

Born in Boston he attended Harvard University and received his degree from Harvard Medical School in 1889. He studied in London and Paris, and practiced medicine in Boston for eight years before entering the naval corps.

Dr Payne was a fellow of the Massachusetts Medical Society and the American Medical Association and held memberships in the Association of Military Surgeons of the United States and the British Medical Association.

His widow, a son and a daughter survive him.

PRATT—DAVID D. PRATT M.D. of New Bedford died January 29. He was in his sixty-first year.

Born in Wisconsin, he attended Dartmouth College and received his degree from the Harvard Medical School in 1906.

Dr Pratt was a fellow of the Massachusetts Medical Society the American Medical Association and the American College of Surgeons. He was also a member of the New Bedford Medical Society.

His daughter a son, a brother and a niece survive him.

WHITESIDE—GEORGE S. WHITESIDE, M.D., of New York City died January 29. He was in his sixty-eighth year.

Born in Boston he attended Harvard University and received his degree from Harvard Medical School in 1897. He was formerly examining physician for several insurance companies and had served as surgeon for the Winchester Arms Company of New Haven.

Dr Whiteside was a former member of the Massachusetts Medical Society and was a fellow of the American Medical Association and the American College of Surgeons. Formerly he was secretary of the Harvard Medical Alumni Association.

His widow two sons and a daughter survive him.

CORRESPONDENCE

PATHOLOGICAL SERVICE FOR THE SMALL HOSPITAL

To the Editor Recently a group of small hospitals near Boston requested the New England Pathological Society to aid them in obtaining the services of a pathologist. This was the first time in its history that the society had been directly approached by a hospital for such a purpose, and it was believed that perhaps this was the beginning of an opportunity for the society to act as an impartial adviser to hospitals with respect to their pathological services only of course when directly solicited. The society has therefore appointed a committee the members of which will act as consultants and as a clearing house to help both hospitals and pathologists.

Any request for information should be forwarded to the secretary

BENJAMIN CASTLEMAN Secretary
New England Pathological Society

Massachusetts General Hospital
Boston.

A SURE CURE

To the Editor Below is a copy of an item taken from Middlebrook's *New England Almanac* for the year 1830

which I thought might be of interest to readers of the *Journal*

An exchange says Every little while we read in the papers of someone who has stuck a rusty nail in his foot, or knee, or hand or some other portion of his body and that lockjaw resulted therefrom, of which the patient died. If every person was aware of a perfect remedy for all such wounds, and would apply it, then all such reports must cease. Yet all these wounds can be healed. The remedy is simple, almost always on hand and can be applied by anyone, and what is better it is infallible. It is simply to smoke the wound that is inflamed with burning wool or woollen cloth. Twenty minutes in the smoke of wool will take the pain out of the worst wound, repeated two or three times it will allay the worst cases of inflammation arising from a wound.

CHARLES W. ROBERTSON M.D.

Amherst, Mass.

RESTORATION OF LICENSE

To the Editor This is to inform you that in accordance with the vote of the Board of Registration in Medicine, the license of Dr Rafael R. Garcia of Agawam revoked on September 29 1938 was restored on January 18, 1940

STEPHEN RUSHMORE M.D., Secretary

State House,
Boston.

NOTICES

ANNOUNCEMENTS

JACOB KAMINSKY M.D. announces the opening of an office at 891 Massachusetts Avenue, Cambridge.

HYMAN H. SHUMAN M.D. announces the opening of an office at 107 Prichard Street, Fitchburg

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday February 14 at 12 o'clock noon, in the Pathological Amphitheater

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday February 14 from 2 to 4 p.m. Drs. Elliott C. Cutler and Soma Weiss will speak on "Nervousness."

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

The next meeting of the Boston Society of Psychiatry and Neurology will be held at the Boston Medical Library on Thursday evening February 15 at 8 15

PROGRAM

A Phantasy Gratified by a Suicidal Act. Dr Ives Hendrick.

Prefrontal Lobotomy in Two Patients with Agitated Depression With therapeutic evaluation and further reference to prefrontal-lobe function. Drs. W. J. Mixter K. J. Tillotson and David Wiers.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, February 13, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 8 15 p.m.

PROGRAM

Presentation of cases

The Application of Medical Science to the Administration of Justice. Dr Alan R. Moritz.

Medical students and physicians are cordially invited to attend.

NU SIGMA NU LECTURE

The annual lecture sponsored by the Harvard chapter of Nu Sigma Nu will be given in Building E of the Harvard Medical School on Thursday, February 29, at 5 00 p.m. Dr Donald D Van Slyke, of the Rockefeller Institute, will speak, his subject being "Renal Physiology"

LAWRENCE CANCER CLINIC

The regular Lawrence Cancer Clinic, to be held at Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, February 20, at 10 00 a.m., will be a demonstration and teaching clinic for physicians, with Channing C Simmons, M.D., of Boston, as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

SUFFOLK CENSORS' MEETING

The censors of the Suffolk District Medical Society will meet for the examination of candidates at the Boston Medical Library, 8 Fenway, Boston, on Thursday, May 2, at 4 00 p.m.

Candidates should make personal application to the secretary and present their medical diplomas at least six weeks before examination (if graduates of foreign medical schools or schools not on the list recognized by the Council, at least eight weeks before)

WORCESTER DISTRICT MEDICAL SOCIETY

The next meeting of the Worcester District Medical Society will be held at the Worcester State Hospital, Worcester, on Wednesday, February 14. Dinner will be served by the hospital at 6 30 p.m. Following dinner there will be a business and scientific meeting. Dr William Malamud will present a paper on "The Treatment of the Neuroses in General Practice." Saul Rosenzweig will speak on "Experimental Neuroses," and the talk will be illustrated by Maier and Glazer's movie film which was awarded a prize by the American Association for the Advancement of Science.

NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held on Thursday evening, February 15, at 8 00 at the Tufts College Medical School, 416 Huntington Avenue, Boston.

PROGRAM

Pathological Observations in Simmonds' Disease. Dr R. C. Wadsworth.

Immediate Wheal and Erythema Type Reactions to Simple Chemical Substances. Dr John Jacobs.

Pathological Findings in Leukoerythroblastic Anemia. Dr S. B. Thorson.

Primary Tumor of the Heart. Dr Harold Wood.

The pathological demonstrations will be available at 7 00 p.m. There will be a short business meeting followed by a collation.

Physicians and students are cordially invited to attend.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at "The Hut," on Friday afternoon, February 14, at 3 00. Dr John W. Strieder will be the guest speaker, his subject being "Clinical Aspects of Bronchogenic Carcinoma."

HATHERLY MEDICAL CLUB

There will be a meeting of the Hatherly Medical Club at the Toll House on Wednesday afternoon, February 14, at 3 00. Dr William E. Browne will be the guest speaker, his subject being "Diagnosis and Treatment of Nerve and Tendon Injuries to the Hand."

VAN METER PRIZE AWARD

The American Association for the Study of Goiter again offers the Van Meter Prize Award of three hundred dollars and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The award will be made at the annual meeting of the association which will be held at Rochester, Minnesota, on April 15, 16 and 17, providing essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations, should not exceed three thousand words in length and must be presented in English, a typewritten double-spaced copy should be sent to the corresponding secretary, Dr W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than March 15.

A place will be reserved on the program of the annual meeting for presentation of the prize essay by the author, if it is possible for him to attend. The essay will be published in the *Proceedings* of the Association. This will not prevent its further publication, however, in any journal selected by the author.

ALUMNI DAY, NEW YORK UNIVERSITY COLLEGE OF MEDICINE

Alumni Day of New York University College of Medicine will be held on February 22. Following opening remarks by Dr James S. Smith, president of the Alumni Association, a series of formal lectures on "Modern Aspects of Preventive Medicine" will be presented at the medical school during the morning and afternoon sessions. Luncheon will be served at the school at 1 00 p.m. Dean McEwen will be host at an informal reception in the dean's office at 5 00 p.m.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY FEBRUARY 11

SATURDAY FEBRUARY 11

- 4 p.m. Cancer. Dr. Grantley W. Taylor. Free public lecture. Harvard Medical School, amphitheater of Building D.
- 4 p.m. Cancer of the Stomach. Dr. Marshall K. Bartlett. Illustrated, public, health lecture. Faulkner Hospital auditorium.

TUESDAY FEBRUARY 13

- 9-10 a.m. Hospital case presentation. Dr. S. J. Thabauer. Joseph H. Pratt Diagnostic Hospital.
- 8:15 p.m. The Obstetric Pelvis. Dr. W. E. Caldwell. Journal Club. Boston Lying-in Hospital.
- 8:15 p.m. The Application of Medical Science to the Administration of Justice. Dr. Alan R. Moritz. Harvard Medical Society. Peter Bent Brigham Hospital amphitheater (Rushmore Street entrance).

WEDNESDAY FEBRUARY 14

- 9-10 a.m. Clinicopathological conference. Dr. C. S. Keefer. Joseph H. Pratt Diagnostic Hospital.
- 12 m. Boston City Hospital, monthly clinicopathological conference.
- 3-4 p.m. Nervousness. Drs. Elliott C. Cutler and Soma Weiss. Peter Bent Brigham Hospital.

THURSDAY FEBRUARY 15

- 8 p.m. New England Pathological Society. Tufts College Medical School.
- 8:15 p.m. Boston Society of Psychiatry and Neurology. Boston Medical Library.

FRIDAY FEBRUARY 16

- 9-10 a.m. Some Observations on Pituitary Adenoma. Dr. M. C. Sommers. Joseph H. Pratt Diagnostic Hospital.

SATURDAY FEBRUARY 17

- 9-10 a.m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

- FEBRUARY 9—William Harvey Society. Page 203. Issue of February 1.
- FEBRUARY 11—Public lecture. Salem Hospital. Page 1042. Issue of December 28.

- FEBRUARY 11—Free public lecture. Quincy City Hospital. Page 77. Issue of January 11.

- FEBRUARY 11-14—International College of Surgeons. Page 759. Issue of November 9.

- FEBRUARY 14—New England Dermatological Society. Page 203. Issue of February 1.

- FEBRUARY 14—Hatherly Medical Club. Page 244.

- FEBRUARY 16—Staff meeting. United States Marine Hospital. Page 244.

- FEBRUARY 28—Lawrence Cancer Clinic. Page 244.

- FEBRUARY 28—South End Medical Club. Page 202. Issue of February 1.

- FEBRUARY 28—Alumni Day. New York University College of Medicine. Page 244.

- FEBRUARY 22-23—American Orthopsychiatric Association. Page 957. Issue of December 14.

- FEBRUARY 29—Nu Sigma N. Lecture. Page 244.

- MARCH 2, JUNE 8 and 10—American Board of Ophthalmology. Page 719. Issue of November 2.

- MARCH 7-9—New England Hospital Association. Hotel Statler Boston.

- MARCH 14—Penetec Association of Physicians. 8:30 p.m. Hotel Statler, Haverhill.

- APRIL 15-17—American Association for the Study of Goiter. Page 203. Issue of February 1.

- APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.

- MAY 10-18—American Scientific Congress. Page 1043. Issue of December 28.

- MAY 13—United States Pharmacopoeial Convention. Page 202. Issue of February 1.

- JUNE 7-9—American Board of Obstetrics and Gynecology. Page 1019. Issue of June 15.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

- FEBRUARY 14—Cough, Sputum, Hemoptysis—How shall they be investigated? Dr. Reeve H. Bess. Essex Sanatorium, Middleton.

- MARCH 6—Experimental and Clinical Consideration of Sulfanilamide Treatment of Hemolytic Streptococcus Infections. Dr. Champ Lyons. Lynn Hospital, Lynn.

- APRIL 3—Addison Olcott Hospital, Gloucester.

- MAY 8—Annual meeting. Salem Country Club, Peabody.

FRANKLIN

- MARCH 12—Franklin County Hospital. Greenfield.

- MAY 14—Franklin County Hospital, Greenfield.

HAMPSHIRE

- MARCH 13

- MAY 8.

- Meetings are held at 11:30 a.m. at the Coolidge Dickinson Hospital, Northampton.

MIDDLESEX EAST

- MARCH 20.

- MAY 15.

- Meetings are held at 12:15 p.m. at the Unicorn Country Club, Stoughton.

MIDDLESEX NORTH

- APRIL 24

- JULY 31

- OCTOBER 30.

NORFOLK SOUTH

- MARCH 7

- APRIL 4

- MAY 2.

- All meetings, with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

- MARCH 21—Goodard Hospital, Brockton.

- APRIL 18—State Farm.

- MAY 16—Lakerville Sanatorium, Lakerville.

SUFFOLK

- MARCH 27—Scientific meeting. Symposium on Ulcerative Colitis and Diarrhea. Under the direction of Dr. Chester M. Jones.

- APRIL 24—Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

- MAY 2—Censors meeting. Page 244.

WORCESTER

- FEBRUARY 14—Page 244.

- MARCH 13—Worcester Memorial Hospital.

- APRIL 10—Worcester Hahnemann Hospital.

- MAY 8—Worcester County Club.

- Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

Clinique et phynopathologie des maladies coeliagues Robert Dubois. 349 pp. Paris Masson et Cie, 1939. 80 Fr. fr.

Cardiovascular Renal Disease. A clinicopathologic correlation study emphasizing the importance of ophthalmoscopy Lawrence W. Smith, Edward Weiss, Walter I. Lillie, Frank W. Konzelmann and Edwin S. Gault. 227 pp. New York and London D. Appleton-Century Co., 1940. \$4.50.

Lane Medical Lectures. Viruses and virus diseases Thomas M. Rivers. 133 pp. Stanford University California Stanford University Press, 1939. \$2.50.

An Introduction to Gastro-Enterology Walter C. Alvarez. Being the third edition of *The Mechanics of the Digestive Tract* 778 pp. New York and London Paul B. Hoeber Inc., 1940. \$10.00.

Citrus Fruits and Health. Clinical and scientific data from the literature of nutrition as related to citrus fruits 73 pp. Lakeland, Florida Florida Citrus Commission, 1939. Complimentary.

Fundamentals of Biochemistry in relation to human physiology T. R. Parsons. Sixth edition. 461 pp. Baltimore William Wood & Co., 1939. \$3.00.

Surgical Diagnosis Stephen Power. 228 pp. Baltimore William Wood & Co., 1939. \$4.50.

Massage and Remedial Exercises In medical and surgical conditions Noel M Tidy Fourth edition. 458 pp Baltimore William Wood & Co, 1939 \$5 25

Demonstrations of Physical Signs in Clinical Surgery Hamilton Bailey Seventh edition. 310 pp Baltimore William Wood & Co, 1940 \$6.50

Standard Methods of the Division of Laboratories and Research of the New York State Department of Health Second edition 681 pp Baltimore Williams & Wilkins Co, 1939 \$7.50

BOOK REVIEWS

Psychopathic States D K Henderson. 178 pp New York W W Norton & Co, Inc., 1939 \$2 00

The problem of that heterogeneous and ill-defined psychiatric group known as the constitutional psychopathic inferior is of importance, inasmuch as the conduct of the members of this group is often such as to bring them into conflict with the law and consequently involves psychiatric expert testimony, and it is this problem that Dr Henderson, the eminent British psychiatrist, considers. His discussion has charm and wisdom, and he comes to the predestined conclusions that much more research and more exact studies must be done before the conditions described under this widespread term can be understood and socially or psychiatrically treated.

The constitutional psychopathic inferiors constitute a group in which the conduct disorder and general psychological reactions run the gamut from the liar-swindler type to the less numerous and more bizarre individuals in whose life homosexuality, rape and ferocious immorality appear, and whose responsibility consequently must be passed on. In between these extremes of conduct, one meets the chronic alcoholic, the drug addict, the ne'er-do-well and those unemployable individuals whose difficulty is not due to physical disease but to a mental state which cannot be classified as psychotic or neurotic but comes down to instability of personality of one type or another.

It will be seen that there can be no sharp differentiation between the normal and these individuals. Homosexuality and other abnormal sexual manifestations are widespread and involve individuals whose lives otherwise run not only along normal lines but sometimes along super-normal ones. Similarly, alcoholism cannot be linked with social or psychological inferiority since among the alcoholics one often finds the geniuses of the race.

Indeed, Dr Henderson brings up the question which for so long a time has been a focus of human attention, — whether or not genius is a psychopathic trait, — to which Lombroso, Nordau and Henderson, as well as many others, have answered "Yes," and other workers, especially the eugenicists, "No." As a matter of fact, generalizations can no more be made about the trait of genius than about the qualities of the so-called "normal" individual, since there are many kinds of genius, and high ability of whatever type may be linked to all kinds of qualities of character and personality. The personality of man is not a harmonious composition, no more than his body is. Character is largely a mosaic in which there is often a juxtaposition of the most incongruous qualities. A Bacon may be a great philosopher and a wise lord chancellor, but he may also be a bribe taker and a foolish thief.

Henderson definitely indicates all this. The point of view he expresses is pragmatic and clinical, but he has as yet no solution, either legally or otherwise, for the problems inherent in the term, constitutional psychopathic inferiority, and in the types of individuals classed as suffering from

it. However, he makes the important observation that the law in England has commenced to modify its attitude toward this group, that the concept of limited responsibility is appearing in the court decisions, and that the all-or-none theory of responsibility is passing away, as indeed it should, since there are degrees and shades of responsibility for crime as there are degrees and shades of all human qualities and attributes.

A deeper problem has preoccupied the reviewer for many years. It is assumed that adaptation to whatever happens is the test of normality, and in a certain sense this is true. But human society has built up extraordinary social mechanisms to which the individual must adapt himself, furthermore, it has built up systems of reward for certain types of personality and punishment for others. There is nothing in any candid view of society which indicates that it has shown much wisdom in the selection of either the types it rewards or the types it punishes. Thus, the acquisitive type of human being is over-rewarded. The individual who sacrifices biological necessities, such as reproduction, often has a social advantage over the individual who reproduces freely, as from a biological point of view he should. The person who sacrifices certain social trends in his nature, such as friendliness and generosity, often succeeds, while the individual who expresses these qualities in his life may become a social failure, and so forth. There may be a psychopathic society to which normal individuals cannot adapt themselves and to which certain abnormal individuals are able to adapt themselves. It is not proved that either social success or failure is necessarily a criterion of essential normality or abnormality, or indeed of personal worth or worthlessness.

Midwifery By ten teachers, under the direction of Clifford White. Edited by Comyns Berkeley, Clifford White and Frank Cook. Sixth edition. 676 pp Baltimore William Wood & Co, 1938 \$6 00

This sixth edition is a textbook on obstetrics by ten English obstetricians. The book is written primarily for English students preparing for their final examinations. It has little value from the American standpoint except for the purpose of comparing English methods with those practiced in America. As a reference book it is of value.

Tests for Mental Development. A complete scale for individual examination F Kuhlmann. 314 pp Minneapolis, Nashville, Philadelphia Educational Publishers, Inc., 1939 \$2 00

The author of this book is a well known authority on the subject of mental tests. He presents, for the specialist in the field of psychology, a new scale of tests, based on the Heims mental-growth curve. Practically none of the original Binet tests are used. Some from the author's previous revisions of the Binet scale of 1912 and 1922 and from the Kuhlmann-Anderson group tests are included in modified form. The rest are derived from other sources. The new scale seems to remove some of the disadvantages of the Binet type of scale. The application of these tests in the way that they are intended to be used, however, requires a long period of training and familiarity with the general scope of mental tests.

Workers in the field of psychology will find some of the author's suggestions to be of interest, — for example, his recommendation that the "personal constant" of Heims be used in place of the IQ as a measure of intelligence, — but it is doubtful that the new scale will be of value in the hands of the medical man.

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CLINICAL MEASURES IN THE CONTROL OF SYPHILIS*

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WASHINGTON, DISTRICT OF COLUMBIA

EVERY experienced worker in the field of public health knows that teamwork is one of the most important prerequisites for success. With most of the acute communicable diseases, the teamwork involves chiefly the members of the health department because modern preventive measures have become so highly successful. This is not true, however, with the control of syphilis. The public-health campaign against this disease requires not alone the well-co-ordinated work of members of the health department but the active assistance of the medical profession as well. Control through prevention is the slogan in the acute communicable-disease campaign. Control through treatment is the slogan in the syphilis campaign. In the latter, the major emphasis is on treatment and the physician in general practice. Success in the control of syphilis will therefore be as much a contribution of the private physician as of the health officer.

The more important clinical measures of value in the present campaign will be considered in this paper. Among them are the effective utilization of the serological blood test and the modern treatment schemes for early and latent syphilis and for syphilis in pregnancy.

THE SEROLOGICAL TEST

Studies in the United States by the Committee on Evaluation of Serodiagnostic Tests for Syphilis have disclosed that the serological blood test is one of the most efficient of all laboratory procedures in use at the present time. The work of this committee has been noteworthy because it has been possible, through its activities conducted in co-operation with leading serologists and the several state health departments, to show very marked improvement in serological-test performance during the last few years.

In 1935 the results of the first evaluation of the

original serological tests and modifications used in the United States were published. This and subsequent investigations have proved that modern serological tests properly performed will detect from 80 to 90 per cent of syphilitic patients regardless of the stage of the disease and whether previous treatment has been given. The five serological tests regarded as satisfactory in this country have given on an average less than 0.5 per cent false positive results when performed by the originators.

But the following year a study of the efficiency of performance of these same serological tests for syphilis in state laboratories indicated that work in such laboratories did not in each instance have the same degree of excellence as was exhibited in the laboratories of the originating serologists.

A series of studies of efficiency of performance of serological tests in state laboratories, and a voluntary but intensive advisory program regarding technique, have yielded year by year very marked improvement. Indeed, during the last study by the committee, it was agreed that the character of the work in ten state laboratories was on such a high plane that it was necessary to determine the efficiency of their performance only biennially.

Certain basic principles have been described to which laboratories in general should adhere if the character of serological work performed in them is to be efficient. These basic principles were freely discussed during the Assembly of Laboratory Directors and Serologists held at Hot Springs National Park, Arkansas, October 21 and 22, 1938. Briefly, they consist of an intralaboratory check, using two or more serological techniques on a comparative basis, interlaboratory checks in which one laboratory compares the results of its serological-test performance with those of another laboratory known to be reliable, and a comparison of the serological results against known clinical diagnoses on specimens obtained from a selected group of nonsyphilitic persons and from syphilitic patients.

*Read at the annual meeting of the New Hampshire Medical Society, Manchester, June 9, 1939. From the Division of Venereal Diseases, United States Public Health Service, Washington, District of Columbia.

†Assistant surgeon general, United States Public Health Service, Washington, District of Columbia.

in a first-class clinic. The last is the most important of the three principles. In addition, laboratory directors should hold periodic technical consultation with expert serologists regarding the performance of tests in routine use. If laboratories serving the medical profession are not conducting comparative studies of this kind and seeking expert consultation, the physician in private practice should demand that they do so.

INTERPRETATION OF SEROLOGICAL TESTS

Only three terms should be used in reporting reactions to qualitative serological tests to the physician in general practice—positive, doubtful and negative. The serologist should learn, with such advisory assistance as he may require, to determine as exactly as possible the different degrees of complement fixation or flocculation which are reported as positive or doubtful by the originator of the test he is performing. A negative report naturally indicates no fixation of complement or no flocculation.

In the temperate zone a positive report is almost invariably indicative of syphilis if the possibility of administrative laboratory error is excluded. The diseases which may give false positive reports are mostly tropical, and except for malaria are relatively rare in the United States. A false positive reaction to a test for syphilis occurs in malarial fever only during the clinically active stage of the disease, it returns to negative when the patient recovers.

A single unsupported positive report should not be accepted as evidence of syphilis regardless of the efficiency of the laboratory from which it is received. Technical errors are apt to happen in any laboratory, no matter how well conducted, and in the absence of a definite history or physical evidence of syphilis a diagnosis should never be made until at least two tests, performed on specimens taken at different times, are reported as fully positive. Doubtful reports only indicate that the laboratory technician has been unable to state whether complement fixation or flocculation has occurred. The doubtful report is a request from the laboratory worker that a second specimen be sent to him for examination. If there are no clinical manifestations of syphilis present, a negative reaction must be considered as strongly presumptive evidence that syphilis is not present. On the other hand, if there are suspicious lesions, a negative reaction may be meaningless, and the physician must apply other special examinations before making his diagnosis.

Serological tests for syphilis should be utilized by physicians whenever a physical examination is done. From the standpoint of detecting unrecog-

nized disease, serological tests are more efficient than routine urinalyses, and cost very little more when done in large numbers. Serological blood tests should be a part of the examination of all seriously ill patients, all pregnant women, applicants for jobs and employees in industry and both applicants for marriage licenses.

It is surprising that a few health officers and physicians have objected to the widespread use of the serological blood test to discover syphilis. Laboratory tests are among the most important measures in detecting communicable diseases in public-health practice. The control of hookworm disease and malarial fever would have been much more difficult had not thorough laboratory studies of the feces and blood respectively been conducted in surveys of large population groups. The critical observer of public-health measures is impressed with the fact that the routine laboratory test is one of the most effective and economic methods of case finding when the prevalence of a disease assumes such proportions as syphilis has attained.

New Hampshire is to be congratulated on its early enactment of the law requiring a premarital medical examination including the serologic blood test in order to prevent the transmission of syphilis in marriage. Persons contemplating matrimony constitute a vitally important group from public-health point of view. Approximately 1 per cent of the many hundreds of thousands of people who acquire syphilis every year are less than thirty years of age. Eighty-five per cent of the brides and 65 per cent of the grooms come from this large age group.

The American Social Hygiene Association has recently published a survey of the first seven states which have had premarital laws in operation for a period sufficiently long to give data indicative of their effectiveness. The survey shows that over 225,000 applicants for marriage licenses have been examined in these states, and of them, 3300 were found to have syphilis, the proportion being about the same among men and women. This prevalence rate is in almost exact agreement with estimates previously made by the Public Health Service.

The critical student is convinced that premarital legislation is effective in controlling the conjugal and prenatal transmission of syphilis. He is also convinced that the public demand such laws, and expects the medical and public health profession to develop the necessary measures to enforce them properly.

TREATMENT OF EARLY SYPHILIS

The aim of the treatment of early syphilis is primarily the prevention of the transmission of

the disease, through treatment, and secondarily the recovery of the individual patient. Both laboratory data and more slowly accumulated evidence based upon clinical experience show that radical and complete cure is possible by the correct scheme of treatment. Control of infectiousness, limited largely to the primary, secondary and relapse manifestations of the first two years, is the important public-health attainment of modern treatment.

Let us examine the evidence which is available with reference to these two points in the studies of the Co-operative Clinical Group. In an analysis of the records of 3244 patients with early syphilis under observation for a period of six months or more, it was found that eight out of every ten who had a communicable relapse had received less than fifteen doses of one of the arsphenamines. Thirty-five per cent of these patients with communicable relapse had received less than five doses of an arsphenamine. Indeed, the frequency of communicable relapse was in indirect ratio to the amount of treatment received, particularly arsenical therapy.

Additional data obtained from these studies indicate that the critical time for treatment of the syphilitic patient, in order to prevent the spread of syphilis, is during the first two years of the infection. In the first six months, 45 per cent of all infectious relapses occur, by the end of the first year 74 per cent, and by the end of the second year, 91 per cent.

Treatment of the patient and not of the serological blood reaction is recognized today as one of the cardinal principles of anti-syphilitic therapy. This principle must be impressed upon patients by teaching them that treatment by schedule is the prerequisite to recovery. The serological blood test, when properly used during the administration of treatment, does, however, give valuable prognostic information to the attending physician.

Studies of the Co-operative Clinical Group have established that the failure of the reaction to reverse from positive to negative is more a matter of how treatment is given than of the total amount administered. Regular treatment with arsphenamine and heavy metals, especially in the first three months of the disease, brings about the greatest number of serological reversals. Under the continuous alternating scheme recommended by the Public Health Service, only 25 per cent of the patients whose serological reactions became negative within the first year of the disease developed a communicable relapse. This figure compares with 8.2 per cent of those receiving intermittent treatment with planned rest periods and 12.8

per cent of those non-co-operative patients who came in irregularly for treatment.

It has been found that in more than 90 per cent of the patients beginning treatment in the seronegative primary stage of syphilis, a satisfactory result is attained, a fact which continued observation indicates is tantamount to recovery. When treatment is given by the continuous alternating scheme, beginning at any time during the first year of the disease, recovery may be expected in an average of approximately 80 per cent of the patients.

The evidence which has been accumulated proves that the modern system of treatment for early syphilis must be continuous. It must employ an arsphenamine and preferably a bismuth preparation, the latter intramuscularly. It must include not less than twenty injections of both the arsphenamine and bismuth preparations in order to prevent the transmission of the disease, and not less than thirty injections of both arsphenamine and bismuth preparations in order to secure the ultimate recovery of the patient. The continuous alternating scheme of the Co-operative Clinical Group and the Public Health Service provides for the administration of thirty doses of one of the arsphenamines and forty doses of one of the bismuth preparations administered week by week, series of injections of the arsphenamines and of bismuth alternating over a period of seventy weeks. The blood should be tested at the beginning and end of each series of arsphenamine injections, and the patient warned that negative reports have no significance as an indication of recovery. Weakly positive reports following a negative should be taken as seriously as strong relapsing positives, since experience has shown that the former frequently are an omen of imminent clinical relapse. A spinal fluid examination, including a quantitatively titrated Wassermann test, cell count, protein estimation and colloidal gold test, should be made before the end of the several series of arsphenamine treatments.

PREVENTION OF SYPHILIS IN PREGNANCY THROUGH TREATMENT

The second great opportunity to prevent the transmission of syphilis comes to the physician when the syphilitic pregnant woman presents herself for prenatal care. With early and adequate treatment during pregnancy, the prognosis is most favorable for the birth of a healthy infant. Ten or more injections of one of the arsphenamines and one of the bismuth preparations, the administration of which is begun before the fifth month of pregnancy, will prevent the transmission of the

disease to the fetus in ten out of eleven cases. When treatment is delayed until after the fifth month of gestation, only a little more than half the children will be born apparently nonsyphilitic, even though the maximum amount of treatment possible is given the expectant mother in the remaining months before birth of the child.

Almost all the evidence confirms the opinion that the pregnant woman tolerates anti-syphilitic treatment well. She is a good risk for anti-syphilitic therapy. Co-operative Clinical Group findings, for instance, show that crustaceous dermatitis and icterus, both serious complications of treatment, were commoner in syphilitic women who had never been pregnant. In the pregnant group undergoing treatment, such severe reactions as aplastic anemia, purpura hemorrhagica and death were not reported.

TREATMENT OF LATENT SYPHILIS

The occurrence of the communicable lesions of syphilis after the latent stage of the disease has begun is a rare phenomenon. Likewise, communicable relapse in latency after treatment has been instituted is very rare. Theoretically, from the standpoint of infectiousness, the important problem in latency is a determination of the potential danger of the transmission of syphilis through exposure to semen or to uterovaginal secretions of syphilitic persons. Experimental data from laboratory workers in this field are contradictory. The conflicting character of the evidence, however, suggests that the transmission of syphilis in latency by this means is of relatively infrequent occurrence.

The aim of treatment in latent syphilis, therefore, is to decrease the probability of clinical progression or relapse in comparison with the results attained when no treatment is given, and to increase the probability of cure or arrest. Out of a total of 1936 patients under treatment for latent syphilis, studied by the Co-operative Clinical Group, there were only 94 who experienced some form of relapse. Sixteen of the 94 patients had had syphilis for less than four years and sustained a communicable relapse. Thirty-one had complications involving the heart and great blood vessels, and 30 had a central-nervous-system relapse. In 5 there was visceral involvement, usually of the liver.

Of the 94 patients who had a clinical relapse, a satisfactory result was ultimately attained in 20 by the administration of treatment. In only 8 of the 30 relapsed cases with central-nervous-system involvement was enough damage done to cause distressing manifestations. In only 7 of the 31 patients with a cardiovascular relapse did the condition develop into an incapacitating one.

Clinical relapse was found to be only slightly more frequent in patients with persistently positive blood reactions than in patients whose reactions became negative. The latent syphilitic patient, therefore, is in no special danger because of the persistence of a positive blood reaction. In other words, serological resistance is not necessarily an unfavorable omen in latent syphilis, unless the spinal fluid is positive or a teleroentgenogram of the cardiovascular stripe shows suggestive evidence of involvement of the cardiovascular system.

The outline of treatment which has been recommended by the Co-operative Clinical Group for the patient with latent syphilis consists of twenty-four doses of neoarsphenamine in series of eight injections, alternating with courses of bismuth totaling from fifty to sixty doses. Periods of rest from treatment should be limited to the late latency of syphilis. In early latency (syphilis of less than four years' duration), the continuous alternating scheme described under early syphilis should be followed. In latent as in early syphilis, treatment should be by schedule and not by serological blood reaction.

CONCLUSIONS

The physician in private practice can make the greatest contribution in the campaign against syphilis by doing an efficiently performed serological test for syphilis routinely on all his patients, by treating all patients with early syphilis, using the continuous alternating scheme, by treating syphilis in pregnancy early and adequately and by preventing the late crippling manifestations of syphilis by treatment of patients with latent syphilis according to a proper schedule.

In rendering this medical service, full co-operation of the private physician with existing health authorities in reporting new patients, and thorough participation in health-department case finding and case-holding activities, are assumed.

RUPTURE OF THE RETROPERITONEAL DUODENUM*

Report of a Case

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WILLIAMANTIC AND STORRS, CONNECTICUT

RUPTURE of the duodenum may occur as the result of a perforation of an ulcer, the penetration of a foreign body, accidental wounding incidental to some operative procedure or severe trauma to the abdomen.

Clinical experience has frequently verified the fact that relatively minor degrees of trauma are capable of causing rupture of parts of the intestinal tract other than the duodenum. While fixation of the latter just in front of the spine might appear to render it distinctly vulnerable, the protection afforded by the costal margin, the liver, the transverse colon and mesocolon and the mesenteric root minimizes the possibility of injury except by trauma of considerable magnitude.

Traumatic rupture of the duodenum, therefore, is not a common experience in surgery. Leibowitz¹ in 1930 amassed 176 cases from the literature, while Rowlands² found that out of 381 cases of ruptured intestines only 23 involved the duodenum. Other writers on this subject have estimated the incidence of duodenal rupture as varying from 2 to 11 per cent of all traumatic ruptures of the intestines.

These figures obviously refer to injuries of all portions of the duodenum. Traumatic rupture of the retroperitoneal portion is an exceedingly rare and grave condition, probably occurring in less than one third of traumatic duodenal ruptures, and in only a few isolated cases has recovery been noted. It is also interesting to point out that LeBauer and Paltman³ have recently reported a case of retroperitoneal rupture of a duodenal ulcer.

The rarity and gravity of traumatic rupture of the retroperitoneal duodenum seemed to justify reporting the following case.

CASE REPORT

A. N. (No. 15420) a 21-year-old student, was admitted to the Windham Community Memorial Hospital on February 22, 1939 complaining of pain in the right side. The family and past histories contributed nothing significant.

Slightly over 2 hours before admission the patient, while practicing diving in the college swimming pool misjudged

his distance from the end of the board. He stated that following his spring he grazed his head on the end of the diving board, which struck him in the right chest and right side of the abdomen as he went down. He was not rendered unconscious and was able to get out of the pool with some assistance. He complained at once of severe upper abdominal pain which within the next 30 minutes began to extend down the whole right side of the abdomen. About 2 hours after the injury he was seen by one of us (R. L. G.) and hospitalization was immediately advised. On the way to the hospital the patient vomited for the first time, although he had been nauseated since the onset. He stated that the pain was localized in the right abdomen, chiefly below the umbilicus, and was steady rather than cramplike. He had no pain in the back or in the shoulder. He had not voided for several hours.

Physical examination revealed a very well-developed muscular young man obviously in great pain lying in bed with the right thigh flexed. He was rather pale and a cold perspiration covered his skin. There was a small laceration of the scalp. Beginning about 5 cm. below the right nipple line was a broad band of linear abrasions extending down the right abdomen and right thigh. Liver dullness was present. There were moderate tenderness and muscle spasm in the whole right abdomen much more striking in the right lower quadrant. There was slight tenderness in the left lower abdomen without muscle spasm. There was no suggestion of any boardlike rigidity. Priapism was present. There were no tender areas over the spine, and the rest of the examination was essentially negative.

The blood pressure was 144/94, the temperature 97.2 F., the pulse 70 and the respirations 22. The white-cell count was 22,600 with 96 per cent polymorphonuclears, 3 per cent lymphocytes and 1 per cent transients. A catheterized specimen of the urine showed it to be grossly clear with a specific gravity of 1.031. There was a trace of albumin, but no sugar, acetone or diacetic acid was present. Microscopically there were 1 to 3 granular casts and 3 to 8 red blood cells per high-power field. Films of the lumbar spine showed no evidence of fracture or dislocation. The lateral films showed considerable air in the retroperitoneal tissues surrounding the kidneys and along the iliopsoas muscle. The preoperative diagnosis was possible ruptured viscus.

Under cyclopropane anesthesia the abdomen was opened through a low right-rectus muscle-splitting incision and the peritoneal cavity was opened without incident. There was a very small amount of clear fluid in the abdomen but in the cul-de-sac was a small amount of slightly blood-tinged fluid. The rest of the peritoneal cavity seemed to be perfectly dry and there was no evidence of any intra-abdominal hemorrhage or of the presence of intestinal contents. Beneath the serosa of the lower ascending colon and cecum and terminal ileum there were areas of white frothy fluid which crepitated on palpation. There was also crepitation in the mesentery of the terminal ileum. Just lateral to the cecum and ascending colon there was extensive retroperitoneal emphysema and this seemed to extend all the way up

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on the lateral side of the ascending colon. The appendix was normal. There was no evidence of a Meckel's diverticulum. There were a few lymph nodes in the mesentery of the terminal ileum, which were not injected. The small bowel was examined and found to contain no evidence of perforation or any mesenteric hemorrhage. The liver and gall bladder were normal to palpation. No fluid or blood seemed to be coming from the upper abdomen. The right kidney was normal to palpation. The bladder was examined with the patient in the Trendelenburg position, and there was no evidence of any intraperitoneal rupture.

An incision was made into the peritoneum just lateral to the cecum, opening up the retroperitoneal space. Bubbles of gas escaped, as well as a thin, white, frothy fluid. There was no odor to this fluid. There was no evidence of any rupture of the ascending colon posteriorly. The incision in the posterior peritoneum was closed. No apparent intra-abdominal cause could be found for this retroperitoneal emphysema. It was thought that a chest injury might be responsible for this extravasation of air in the retroperitoneal space. The abdomen was therefore closed in layers in the usual manner without drainage.

Following operation the patient continued to complain of severe abdominal pain, vomited coffee-grounds material and developed a weak, thready pulse. Transfusion improved his condition temporarily, but death occurred about 38 hours postoperatively.

Autopsy At postmortem examination there was a considerable amount of blood tinged fluid in the peritoneal cavity but no evidence of peritonitis. The retroperitoneal space, especially in the right abdomen, was ballooned with a massive collection of greenish fluid. When this space was opened the fluid was found to be obviously duodenal contents, and was discovered to have come from a perforation the size of the index finger, just below the junction of the horizontal with the descending portion of the retroperitoneal duodenum. The anatomical diagnosis was rupture of the retroperitoneal duodenum, with retroperitoneal cellulitis.

It is apparent from a review of the literature that the exceedingly high mortality accompanying traumatic rupture of the duodenum is due essentially to three factors: failure to make a diagnosis sufficiently early to render proper treatment effective, failure to recognize the condition at operation, and technical difficulties encountered in repairing the retroperitoneal duodenum and establishing adequate drainage of the retroperitoneal space.

Early diagnosis is rendered extremely difficult by the fact that extravasation of duodenal contents retroperitoneally does not cause peritonitis, at least until an advanced stage has been reached and leakage has occurred into the peritoneal cavity. As a result, the dramatic boardlike rigidity of intraperitoneal duodenal rupture may not be present. The abdomen may show comparatively little muscle spasm, although tenderness of varying degree, especially in the right abdomen, is always present. Knaggs⁴ believes that a valuable diagnostic sign is a right-sided dullness, continuous with liver dullness and not shifting. He

attributes this dullness to an effusion in the retroperitoneal space on the right side, but admits that when it has developed the patient has probably reached a late and hopeless stage. The abdominal examination frequently seems to be out of proportion to the degree of the trauma, the severity of the pain and the obvious seriousness of the patient's condition. Several cases are reported, however, in which the symptomatology was so mild following the injury that the patient did not even consult a physician for several hours. Early vomiting is nearly always present.

The pain as a rule is severe and uninterrupted, and is usually greatest in the right abdomen, especially in the right lower quadrant and often in the right kidney region posteriorly. Butler and Carlson⁵ report a case in which the patient had severe pain in the testicles, which they attributed to an irritation by duodenal contents of the sympathetic chain accompanying the spermatic arteries. A similar cause cannot be ascribed to the priapism which occurred in this case, since stimulation of the sympathetic fibers tends to cause erections to disappear. Langworthy⁶ suggests three possible explanations for the priapism in this case: local trauma, including irritation of the parasympathetic fibers, traumatic obstruction to the return of venous blood from the penis, and concussion of the spinal cord without fracture of the vertebrae.

Emphysema of the lateral abdominal wall has been noted, and in 1 case, emphysema of the retroperitoneal pelvis was discovered on rectal examination. The presence of gas in the retroperitoneal space should be the most valuable early diagnostic sign, because it can be readily demonstrated by x-ray. Sperling and Rigler⁷ have reported the only other case of rupture of the retroperitoneal duodenum in which radiographic examination of the abdomen showed the presence of gas in the retroperitoneal space. These authors point out that gas in the retroperitoneal space can have only three origins: from artificial introduction, from the presence of a gas-forming bacillus in the retroperitoneal space, or from rupture of a hollow viscus having a retroperitoneal course. The latter must obviously be either the duodenum or certain portions of the large bowel. Since the first two causes can easily be eliminated, the significant value of scout films following abdominal trauma becomes at once apparent.

Failure to recognize the condition at operation has been recorded in many cases, and has occurred chiefly when exploration has been done within a short time of the injury. The peritoneal cavity may be entirely negative at this time, but various authors have reported evidences of it

or blood behind the peritoneum, and in some cases either bloody or bile-stained fluid intraperitoneally. Signs of hemorrhage have been noted in the region of the hepatic flexure, as well as yellowish gray patches subperitoneally near the duodenojejunal flexure. Fat necrosis has been observed, probably caused by the escape of pancreatic juice from the duodenum or from an associated injury to the pancreas.

Retroperitoneal emphysema has been found in many cases, and in our case was practically the only finding at operation. Since operation was performed within three hours of the injury, it is reasonable to assume that it may constitute one of the earliest evidences of rupture of the retroperitoneal duodenum. The emphysema may be so widespread as to extend beneath the serosa of the ascending colon, the cecum and the terminal ileum and into the mesentery of the terminal ileum. Butler and Carlsson⁵ noted emphysema between the transversalis fascia and peritoneum on opening the abdomen.

Cases which have been recognized at operation have presented technical difficulties of exposure, repair of the duodenal injury and adequate drainage. The symptoms and signs so often seem localized in the right lower quadrant that a low rectus incision is frequently made and is obviously inadequate. Mobilization of the upper ascending colon is usually necessary in order to gain sufficient exposure. Small ruptures have been easily repaired, but in many cases the tear has been so complete that practically an end-to-end anastomosis has had to be done. In extensive tears, the complete closing of each end, followed by gastroenterostomy, has been suggested.

Regardless of the method employed to repair the rupture, the problem of drainage of the retroperitoneal space remains. Since the cause of death in these cases is undoubtedly a retroperitoneal cellulitis, adequate drainage is of paramount importance. Knaggs,⁴ who has written an excellent paper on this injury, believes drainage anteriorly is useless, although Pedisic⁸ reports recovery of a case drained from the front and complicated postoperatively by the formation of a pancreatic pseudocyst. Many cases have been drained through the

loin. Knaggs believes that an attempt should be made to deal with it on lines similar to those adopted in extravasation of urine. He states:

The retroperitoneal space might be opened up widely by an incision carried through the parietes like that known as Morris' incision for exploration of the kidney, and this opening might be enlarged by other incisions carried backwards and forwards at right angles to the main incision at such points as would lead to the most effectual exposure of the infiltrated area. The wound would have to be kept widely open by the use of large drainage tubes and light gauze packing. No doubt such a procedure is a serious one to adopt at the close of a difficult abdominal operation, but as a fatal issue is certain unless the cellulitis can be quickly relieved its gravity should not prevent its adoption.

CONCLUSIONS

Traumatic rupture of the retroperitoneal duodenum is one of the most serious abdominal injuries.

The extraordinarily high mortality accompanying it is due largely to the lack of familiarity with its clinical picture, the failure to appreciate the significance of retroperitoneal emphysema or bile-stained fluid, the technical difficulties encountered in repairing faultlessly the duodenal rupture, and the extreme difficulty in securing efficacious drainage of the retroperitoneal space.

The discovery of gas in the retroperitoneal space, either preoperatively or at operation, is almost pathognomonic of the condition.

Radiographic examination can demonstrate the presence of gas in the retroperitoneal space, and scout films of the abdomen should therefore be a routine procedure in all cases where a ruptured viscus is suspected.

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FACTORS INFLUENCING PERSISTENT AND RECURRENT HYPERTHYROIDISM*

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THE problem of persistent and recurrent thyrotoxicosis following apparently adequate subtotal thyroidectomy has been discussed perennially ever since the surgical treatment of toxic goiter was standardized on a sound basis. The striking beneficial effect of surgical treatment in the great majority of cases is widely acknowledged. In some cases, however, thyroidectomy is followed either by residual thyrotoxicosis or by recurrence of the whole syndrome, several months or years later. There is considerable difference of opinion as to the incidence of these unsatisfactory results, the incidence given in the literature vary-

Graves syndrome. Others, like Lahey and Clute,¹ Thompson et al.² and Cattell and Morgan³ conceive the solution of the problem to lie in adequate thyroidectomy, while recognizing the important factors arising from the patient as a whole. Scott⁷ even advocates total thyroidectomy as the most rational solution of the problem, believing apparently that the artificial myxedema thus produced is more easily controllable than is persistent or recurrent thyrotoxicosis.

In the last seven years, at the Endocrine Clinic of the Beth Israel Hospital, we have seen and followed carefully 15 cases of persistent or recur-

TABLE 1 *Data in Patients with Recurrent Thyrotoxicosis Following Primary Operations Done Elsewhere*

| CASE NO. | SEX AND AGE | PRIMARY OPERATION | RECURRENCE | PROBABLE FACTORS IN RECURRENCE |
|----------|-------------|---|---|--|
| 1 | F 43 | September 1921 bilateral subtotal thyroidectomy | October 1930 no palpable thyroid tissue, controlled by iodine | Menopausal syndrome |
| 2 | F 34 | June 1922 bilateral subtotal thyroidectomy | February 1932 bilateral subtotal thyroidectomy | Marital infelicity, financial insecurity, frequent severe upper respiratory infections |
| 3 | F 62 | March 1926 bilateral subtotal thyroidectomy | June 1933: regrowth of thyroid tissue; subtotal hemithyroidectomy in September 1935 (injury of right recurrent nerve) | Inadequate thyroidectomy |
| 4 | F 78 | September 1926 bilateral subtotal thyroidectomy | June 1935 right hemithyroidectomy (injury of right recurrent nerve) | Pregnancy with toxemia and sudden financial reverses |
| 5 | F 52 | February 1928 bilateral subtotal thyroidectomy | April 1935 marked regrowth of thyroid tissue controlled by iodine | Inadequate thyroidectomy |
| 6 | F 34 | June 1932 bilateral subtotal thyroidectomy | May 1936 marked regrowth of thyroid tissue; bilateral subtotal thyroidectomy in November 1935 (temporary right recurrent paresis) | Inadequate thyroidectomy |

ing between 0.25 and 25 per cent, according to Thompson, Morris and Thompson.¹

Attempts to solve this problem likewise have varied considerably. Some, like Clarke and Black² and Moschocowitz,³ impressed with the fact that toxic goiter is a constitutional disease of unknown etiology, have advocated treatment of the unique personality of the patient by various means in order to control or prevent persistence and recurrence of symptoms. Crile,⁴ who perceives a biological relation between recurrent thyrotoxicosis, neurocirculatory asthenia and peptic ulcer, has advocated his dekineticizing operation or bilateral denervation of the suprarenal glands for the

recurrent thyrotoxicosis. It may be interesting and instructive to review our experience at this time and to evaluate our own approach to this problem.

MATERIAL OF STUDY

The material of this study consists of 235 unselected cases of toxic goiter operated on during the period 1932-1938. For the purposes of discussion 6 cases with recurrent thyrotoxicosis following subtotal thyroidectomy done elsewhere are listed in Table 1, 4 of these patients were treated by secondary thyroidectomy and 2 by nonsurgical means, and the former are included in our series. Most of these patients were seen in the clinic at monthly intervals for six months following thyroidectomy, and quarterly for at least a year thereafter. At each visit evidence of persistence or recurrence of symptoms and signs was carefully searched for.

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In the entire group of recurrent or persistent thyrotoxicosis there are 12 women and 3 men. It is of interest that all the men showed persistent thyrotoxicosis. Of the 5 women who were subjected to secondary thyroidectomy for either recurrence or persistence, 4 continued to show persistent thyrotoxicosis.

All these patients were closely followed. They were seen at monthly intervals, at which time a complete clinical examination, as well as determinations of the basal metabolic rate and the concentration of cholesterol in the blood, was made. As a group these patients showed no significant difference in age, sex or preoperative duration of thyrotoxicosis as compared with the rest of the patients who showed neither persistence nor recurrence following subtotal thyroidectomy. The average initial basal metabolic rate as well as the response to iodine was quite similar in the two groups. The average initial basal metabolic rate for the group with recurrence and persistence was +42 per cent, while the average basal metabolic rate at the time of persistence or recurrence was +27 per cent. The blood cholesterol values bore no constant relation to the level of the basal metabolic rate. In general they tended to fall within the limits of normal in the group with persistence and recurrence.

The group showing persistence or recurrence did differ importantly from the larger group in that it showed more pronounced vasomotor imbalance and emotional instability and a greater incidence of severe upper respiratory tract infections.

following subtotal thyroidectomy done elsewhere, it was possible to obtain sufficient reliable data as to the severity of the initial disease and the type of operation done. It will be seen from Table 1 that all these patients had had the standard bilateral subtotal thyroidectomy done four to ten years before coming to us with typical symptoms and signs of recurrence. All stated that they had been perfectly well during the intervening years, so that it is reasonably certain that they represent genuine cases of recurrent rather than persistent thyrotoxicosis. Five of these patients showed marked regrowth of the entire thyroid gland. In 1 patient no thyroid tissue could be palpated.

Three patients blamed the recurrence of the whole syndrome on certain events that had transpired shortly before the onset of symptoms. One had had a difficult menopause preceding the recurrence. Another had had frequent severe upper respiratory-tract infections as well as many financial and marital difficulties. The third had gone through a pregnancy complicated by toxemia before noting the symptoms and signs of recurrent hyperthyroidism.

The remaining 3 patients could not trace their symptoms to any particular event. It is noteworthy that in all of these there was marked regrowth of thyroid tissue.

If we now examine those cases of recurrent thyrotoxicosis that followed subtotal thyroidectomy done at our own hospital, we find much the same factors probably responsible for the recurrence of

TABLE 2. Data in Patients with Recurrent Thyrotoxicosis Following Primary Operations Done at the Beth Israel Hospital

| CASE NO. | SEX AND AGE | PRIMARY OPERATION | RECURRENCE | PROBABLE FACTORS IN RECURRENCE |
|----------|-------------|---|--|---|
| 7 | F 26 | July, 1932; bilateral subtotal thyroidectomy | February, 1933, no palpable thyroid tissue controlled with iodine and x-ray (2400 r) | Adequate thyroidectomy (?) psychic trauma |
| 8 | F 29 | August, 1932; bilateral subtotal thyroidectomy | November, 1934, no palpable thyroid tissue controlled by iodine | Recurrence following attack of acute rheumatoid arthritis |
| 9 | F 40 | April, 1933, bilateral subtotal thyroidectomy | June, 1934, regrowth of the old tissue controlled by x-ray (2100 r) and iodine | Inadequate thyroidectomy unpleasant bone situation |
| 10 | F 40 | September, 1936; right hemithyroidectomy; April, 1937, left hemithyroidectomy | May, 1938, no palpable thyroid tissue controlled by iodine | Worry over financial insecurity (?) |
| 11 | F 20 | August, 1937, bilateral subtotal thyroidectomy | April, 1938, no palpable thyroid tissue controlled by iodine | Adequate thyroidectomy (?) marked neurocirculatory stasis |

In all but Case 14 the persistent or recurrent thyrotoxicosis, as judged by the clinical state of the patient and the level of the basal metabolic rate, was definitely less severe than that existing before thyroidectomy.

FACTORS RESPONSIBLE FOR RECURRENT THYROTOXICOSIS

In all the 6 patients with recurrent thyrotoxicosis

signs and symptoms (Table 2). In only 1 of these patients was there palpable thyroid tissue associated with the recurrence. The interval elapsing between the subtotal thyroidectomy and the onset of recurrence was much shorter in this group of 5 patients, the longest being twenty-six months and the shortest eight months. In one patient a history of marked psychic trauma preceded the recurrence, in another it appeared after a severe siege

of acute rheumatoid arthritis, an unpleasant home situation figured as a probable factor in the third patient, constant worry over financial insecurity seemed to precipitate the syndrome in the fourth patient, and in the fifth there was marked vasomotor instability and all the stigmas of neurocirculatory asthenia

In Case 9 there was unquestionably inadequate subtotal thyroidectomy because of much bleeding at operation and generally poor behavior of the patient while on the operating table. The fact that she remained free from any symptoms of thyrotoxicosis for over a year was very surprising, as it was expected that she would show persistence of symptoms and signs. In Cases 7 and 11, the patients had questionably adequate thyroidectomy, despite the fact that no palpable thyroid tissue was present in the neck. In the remaining 2 patients of this group, recurrence took place in spite of apparently satisfactory thyroidectomy.

In recurrent thyrotoxicosis inadequate thyroidectomy seems to play less of a role than do factors such as psychic trauma, infections, pregnancy, the menopause and the personality of the patient.

FACORS RESPONSIBLE FOR PERSISTENT THYROTOXICOSIS

Three of our 7 patients with persistent thyrotoxicosis showed persistence of signs and symptoms two to six months following inadequate secondary subtotal thyroidectomy (Table 3). In 2 of

the thyroidectomy was most probably inadequate, since marked regeneration of the thyroid tissue occurred four months after the operation. In Case 12 the thyroidectomy was done at a time when our clinic was young and the operators less experienced in thyroid surgery, and so the persistence may probably be justifiably attributed to inadequate thyroidectomy. In Case 14, that of a very tall adolescent with only moderately severe thyrotoxicosis and slight thyroid enlargement, thyroidectomy was purposely not radical. His great height, large hands and feet, and facial features, aside from the exophthalmos, suggested hyperpituitarism with secondary thyrotoxicosis. The persistent thyrotoxicosis in him was of greater severity than that before the thyroidectomy. In Case 13, on the other hand, the patient had a radical subtotal thyroidectomy. The only factor apparently responsible for persistence in this case was the striking incidence of severe upper-respiratory-tract infections.

In persistent thyrotoxicosis inadequate thyroidectomy appears to be the chief responsible factor. This is in accord with the experience of Thompson, Morris and Thompson,¹ Cattell and Morgan² and others.

TREATMENT OF RECURRENT THYROTOXICOSIS

Four of the patients with recurrent thyrotoxicosis following subtotal thyroidectomy done elsewhere were subjected to secondary operations on the thyroid gland. In 2 of these patients a bi-

TABLE 3 Data in Patients with Persistent Thyrotoxicosis Following Primary or Secondary or Both Operations Done at the Beth Israel Hospital

| CASE No | SEX AND AGE | THYROID OPERATION | PERSISTENCE | PROBABLE FACTORS IN PERSISTENCE |
|---------|-------------|---|--|---|
| 2 | F 34 | February 1932 bilateral subtotal thyroidectomy | June 1939 regrowth of thyroid tissue—controlled by x ray (2400 r) and iodine | Marital infelicity financial insecurity frequent colds inadequate secondary thyroidectomy (?) |
| 3 | F 62 | September 1935 subtotal hemithyroidectomy (injury of right recurrent nerve) | December 1935 controlled by iodine | Incomplete secondary thyroidectomy because of nerve injury |
| 4 | F 28 | June 1935 hemithyroidectomy (injury of right recurrent nerve) | August 1935 controlled by iodine and x ray (1200 r) | Incomplete secondary thyroidectomy because of nerve injury |
| 12 | M 51 | January 1932 bilateral subtotal thyroidectomy | February 1932 no palpable thyroid tissue controlled by iodine | Neurocirculatory asthenia inadequate thyroidectomy (?) |
| 13 | M 40 | June 1935 bilateral subtotal thyroidectomy | August 1935 no palpable thyroid tissue—controlled by iodine | Frequent upper respiratory tract infections |
| 14 | M 16 | December 1937 bilateral subtotal thyroidectomy | February 1938 no palpable thyroid tissue controlled by iodine | Adequate thyroidectomy (?) hyperpituitarism (?) |
| 15 | F 24 | April 1938 bilateral subtotal thyroidectomy | August 1938 right thyroidectomy controlled by iodine. | Marked neurocirculatory asthenia, strong family history of severe thyrotoxicosis |

these the operation could not be completed because of injury to the right recurrent laryngeal nerve. In the third, thyroidectomy was incomplete because the remnants were almost inextricably buried in extensive and dense adhesions.

Four patients showed persistent thyrotoxicosis one to four months following bilateral subtotal thyroidectomy done at our hospital. In Case 15

lateral subtotal resection was done without any difficulty, except for a temporary right recurrent laryngeal nerve palsy in 1. In the other, regrowth of thyroid tissue and a return of symptoms and signs of hyperthyroidism occurred within four months after the apparently adequate secondary subtotal thyroidectomy. In the remaining 2 patients only subtotal hemithyroidectomy could be

done because of injury to the recurrent laryngeal nerve.

Two patients in this group (Table 1) and the 5 patients with recurrent thyrotoxicosis following subtotal thyroidectomy done at our hospital (Table 2) were treated by means other than surgical. Five patients have been treated by prolonged use of iodine alone, and 2 received x-ray therapy over short periods of time in addition to the iodine medication. The results of this type of treatment have been quite satisfactory and are in accord with the experience of others, notably Thompson, Morris and Thompson,¹ Jackson² and Haines.¹⁰ Thus Cases 1, 7 and 8 showed complete arrest of the syndrome after taking iodine for a period of one to two years. In Case 7, the patient had a normal pregnancy in 1936 without any further recurrence of symptoms or signs of thyrotoxicosis. In July, 1939, however, she returned with signs and symptoms of recurrence, which again were controlled by iodine. A secondary thyroidectomy may become necessary in her case because of fairly marked regrowth of thyroid tissue. The symptoms in Case 5 are completely controlled by iodine medication, taken regularly since April, 1935, in spite of definite regrowth of thyroid remnants. She should probably be subjected to a secondary thyroidectomy because of this but has refused surgery. Cases 9, 10 and 11 have been completely controlled by this nonsurgical regimen, but still show evidence of thyrotoxicosis when the iodine medication is omitted.

The difficulties of secondary thyroidectomy are widely appreciated. For this reason, we attempt to treat cases with recurrence either by the prolonged use of iodine alone or by iodine and one or two courses of x-ray therapy, except for those patients in whom the return of symptoms is accompanied by a definite regeneration of thyroid remnants. We resort to secondary thyroidectomy when these conservative measures fail to control the patient's symptoms completely.

TREATMENT OF PERSISTENT THYROTOXICOSIS

Medical Considerations

Six of the 7 patients with persistent thyrotoxicosis have been treated by nonsurgical means (Table 3). One patient (Case 15) showed striking regeneration of thyroid tissue within four months of an apparently adequate subtotal thyroidectomy, and she was subjected to a secondary thyroidectomy. Because of a severe reaction during the course of the operation only a right subtotal thyroidectomy was performed, with the result that symptoms and signs of thyrotoxicosis still persist, although in a much milder degree they are readily controlled by iodine medication.

Two of the patients had to be given x-ray

therapy in addition to the iodine medication. The others are completely controlled by iodine alone. One of these patients (Case 12) has taken iodine regularly since February, 1932. He has worked full time during this entire period. He still has thyrotoxicosis however, as symptoms and signs return promptly after iodine is omitted.

Thus, in our comparatively small experience, as in the larger experience of others,^{9, 10} the prolonged use of iodine has been effective in controlling the symptoms and signs of recurrent thyrotoxicosis. We give it a fair trial in all cases, except those in which there is marked regeneration of thyroid tissue. X-ray therapy may have to be added occasionally, although the effects of x-ray therapy alone have been less striking than those of iodine medication.

In general, we are in complete accord with Pemberton⁸ in regard to a certain number of patients with persistent thyrotoxicosis following apparently adequate subtotal thyroidectomy. They tend to show persistence or recurrence regardless of presumably adequate surgery. In these unfortunate individuals it seems more rational to use nonsurgical methods of treatment than to resort to total thyroidectomy as advocated by Scott.⁷ The burden of chronic persistent thyrotoxicosis may be more onerous in some patients than that of postoperative myxedema which, we agree with Scott, is quite readily and easily controlled. The difficulty lies in the selection of those patients who show persistence following subtotal thyroidectomy from the general run of patients who respond so brilliantly to that operation. It seems illogical, therefore, to subject all patients with thyrotoxicosis at the primary operation to total thyroidectomy.

Surgical Considerations

A fairly extensive experience with total thyroidectomy has taught us that radical extirpation of the gland, carefully performed, can be accomplished without the fear of tetany or a prohibitive incidence of nerve damage. In this series of patients, the majority of whom were submitted to radical subtotal resections, we had three permanent unilateral nerve injuries (1.3 per cent) and four temporary palsies with full restoration of function occurring in from a few days to eight months. In the five operations for recurrent hyperthyroidism there were two temporary nerve injuries and one permanent. We encountered no case of tetany or of mild parathyroid insufficiency. No special effort is made to search for the parathyroid glands. If one is inadvertently removed, it is promptly reimplanted in the sternomastoid muscle. It has been stated¹¹ that symptoms of hypo-

parathyroidism can probably be attributed more often to injury than to removal of the parathyroid glands. A too diligent search for them during operation should therefore be avoided. Such unnecessary operative insult is prone to result in injury to the nerve and blood supply of these glandules, with the subsequent development of symptoms, usually mild, of impaired parathyroid function.

Our experience with the primary operations for thyrotoxicosis leads us to believe that, except in cases of juvenile hyperthyroidism, radical rather than conservative resection of the gland is indicated. One might theorize that patients with long-standing severe hyperthyroidism who show a good involutonal response to iodine may well be in the terminal phase of the natural course of the disease, and should therefore be submitted to a conservative resection. Conversely it might be argued that patients with a comparatively short history are probably in the early phase of their disease, and should therefore be treated more radically. It would also seem that radical surgery is advisable in those patients who exhibit poor involution and are iodine-resistant. We have, however, with few exceptions, performed radical subtotal thyroidectomy in this series without special regard to the aforementioned considerations and an analysis of our results discloses 5 patients (21 per cent) with recurrent thyrotoxicosis and 7 (30 per cent) exhibiting residual or persistent thyrotoxic symptoms. There were 9 cases (3.9 per cent) of postoperative myxedema, in all of which the symptoms are satisfactorily controlled by small daily rations of thyroid. In most of our patients there was a temporary state of postoperative hypothyroidism with a gradual return to a normal metabolic level.

Some surgeons may be influenced toward a more conservative resection of the gland in toxic goiter in order that a liberal residue of thyroid tissue might be left for the protection of the recurrent laryngeal nerves and the parathyroid glands. While the preservation of both these structures is of course most essential, it is nevertheless true that only small remnants of either lobe of the thyroid gland may be left without seriously increasing the hazard of nerve injury or tetany, provided one is sufficiently acquainted with the normal anatomy and its variations. The application of this more radical approach would in some cases eliminate the subsequent development of persistent or recurrent hyperthyroidism.

The possibility of high superior poles sometimes projecting into the retrolaryngeal plane, retrotracheal extension of either lobe and a pyramidal lobe must all be borne in mind. They should be carefully sought for, adequately exposed

and dealt with accordingly. No tissue is left at the upper poles and the pyramidal lobe as well as the isthmus is always entirely excised in dealing with thyrotoxic patients. By completely mobilizing the lobe the amount of thyroid tissue to be left in the tracheoesophageal sulcus can then be estimated with a fair degree of accuracy. All excised tissue at the completion of the operation is routinely weighed and the probable amount of tissue left in the sulcus is estimated in grams. This more detailed method of appraising the weight of the remaining thyroid tissue has seemed to be more reliable than the previous method of reporting the operation as a "three-fourths" or "five-sixths" subtotal thyroidectomy. It is the amount of tissue left rather than the quantity removed that is the important consideration. In the average case of diffuse toxic goiter operated on, approximately 3 or 4 gm of thyroid tissue is left in each sulcus.

In secondary operations for recurrent toxic goiter the exposed remnants should be radically excised. We are coming to the belief that total or near-total excision of such remnants is probably advisable, fully realizing the technical difficulties that may be encountered. A higher incidence of hypothyroidism or myxedema will follow such maximal extirpation of all demonstrable thyroid tissue, but the untoward symptoms of a depressed metabolism are to be feared less than secondary surgery.

The recurrent nerves are frequently exposed during primary operations, but their identification has not been adopted by us as a routine in all cases. The likelihood of injury to these vital structures, however, would be considerably reduced if they were identified, whenever technically feasible, in patients operated on for recurrent Graves's disease. We have sometimes resorted to direct laryngoscopic visualization of the vocal cords after completing one side of the operation when doubt existed as to the integrity of the nerve. This part of the operative procedure is assigned to the laryngologist. If injury of the homolateral cord is disclosed, the operation is terminated and the contralateral side is completed at a later date if the nerve injury is temporary. While direct laryngoscopy may prove to be an additional burden to an already toxic patient, it is nevertheless worthy of serious consideration if its object is to prevent the tragic complication of bilateral paralysis.

DISCUSSION

The factors influencing persistent and recurrent hyperthyroidism have been studied in a series of 235 cases of toxic goiter operated on from 1932 to 1938. The incidence of persistence and recur-

rence was 51 per cent. This is strikingly low when compared with an incidence of 19.5 per cent in a similar series of 190 cases reported by Thompson, Morris and Thompson,¹ in 1930.

One of the reasons for this low incidence is that radical subtotal thyroidectomy has been done in most of the cases. Another may be that the majority of cases have not been followed for a sufficiently long period of time. It is certainly possible that more of these cases will show recurrence at some later date.

The factors probably responsible for persistence and recurrence have been found in this series to consist of inadequate thyroidectomy, the unique personality and fundamental imbalance of the patients with Graves's disease, frequent upper respiratory-tract infections, and psychic trauma from marital infelicity, financial insecurity and so forth.

No case of either persistent or recurrent thyrotoxicosis has been observed following subtotal thyroidectomy for toxic nodular goiter.

Neither the age, sex, the initial basal metabolic rate nor the degree of response to iodine appeared to play any role in persistent and recurrent thyrotoxicosis.

The symptoms and signs of many patients with persistent or recurrent thyrotoxicosis can be controlled fairly completely by iodine medication either alone or in combination with x-ray treatment.

Nevertheless, the ideal treatment for recurrent and persistent thyrotoxicosis, especially when there is marked regeneration of thyroid tissue, should consist of maximal or total excision of the thyroid remnants. Such a procedure is likely to result in postoperative myxedema, but this can be satisfactorily controlled by thyroid medication.

The incidence of permanent postoperative myxedema in this series of 235 cases was only 3.9 per cent, in spite of the fact that most of them had radical subtotal thyroidectomies.

SUMMARY

In a series of 235 cases of toxic goiter operated on between 1932 and 1938, the incidence of per-

sistent thyrotoxicosis was 3.0 per cent, and that of recurrent thyrotoxicosis 2.1 per cent.

The incidence of permanent postoperative myxedema was 3.9 per cent.

The factors responsible for most cases of persistent and recurrent thyrotoxicosis consisted of inadequate thyroidectomy, the Graves's personality with its fundamental instability frequent upper respiratory-tract infections, and psychic trauma, such as that accompanying pregnancy the menopause and financial insecurity.

A small group of patients showed persistence and recurrence without any assignable cause and in spite of apparently adequate thyroidectomy.

The symptoms and signs of many of the patients with persistent and recurrent thyrotoxicosis can be alleviated by the prolonged use of iodine medication, alone or in combination with x-ray treatment.

It is believed nevertheless, that the ideal treatment of these patients should consist of radical removal of all thyroid remnants whenever conservative methods fail to control the symptoms and in those patients showing marked regeneration of thyroid tissue.

The difficulties encountered in patients subjected to secondary thyroidectomy and ways of surmounting them are discussed.

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DENTAL PROBLEMS ASSOCIATED WITH PREGNANCY*

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THERE is a tendency for obstetricians to have more interest in oral hygiene than was shown a few years ago. Authorities on obstetrics admit that oral hygiene is a good thing, that foci of infection about the mouth may have in certain cases some etiologic bearing on toxemia of pregnancy, pyelitis, puerperal infection, puerperal mastitis and recurrent abortions, and that dental surgery should be performed when it is indicated.

Perhaps the day will come when every expectant mother will be seen by a dental surgeon as a routine part of her prenatal care. This might be a procedure of some value in the prevention of obstetric complications. It certainly would contribute to the health and happiness of the mother during pregnancy. Furthermore, it would tend to ensure at the end of gestation a normal, healthy mother and baby, which, after all, is the aim of modern obstetrics.

Unfortunately, the attainment of ideals is often difficult. In spite of the adoption of prenatal care as an essential part of the obstetric program, very often nothing is done about dental problems during pregnancy unless they are real emergencies. This defect in prenatal care revolves around apathy of the laity as regards the care of their teeth, lack of appreciation by the laity of the association between dental sepsis and poor health, inadequate facilities for proper dentistry during the prenatal period, and unfounded reluctance on the part of dentists and obstetricians to recommend dental surgery during pregnancy.

Through educational measures syphilis is being taken from the category of the taboo. Most obstetricians perform routine serological tests on their patients in an attempt to eliminate congenital syphilis. Perhaps as much good would result from some plan to care adequately for dental problems during pregnancy. The medical and dental professions should co-operate in the establishment of proper facilities for dental care during pregnancy, and should educate the laity in the need for proper oral hygiene as an essential part of prenatal care.

Adequate dental care during pregnancy would aid in the elimination of foci of infection, help prevent further extension of tooth decay, promote the general health of the expectant mother and

ensure a good foundation for proper dental development in the fetus.

FOCAL INFECTIONS

The literature is replete with contradictory opinions concerning the effect of foci of infection on the development of general systemic diseases. The bulk of evidence favors the association of a septic focus with the development in certain cases of diseases such as pyelitis, bacterial endocarditis and arthritis. There is often an improvement in the medical situation with the elimination of the septic focus, be it diseased tonsils, an abscessed tooth or a chronically infected prostate or cervix.

In 1916 La Vake¹ postulated a relation between foci of infection in the teeth and tonsils and the development of toxemia of pregnancy. Talbot² in 1919 reported 97 cases of toxemia of pregnancy with a finding of dental sepsis in every case. He believed that chronic tooth sepsis threw an increased load on the excretory function of the kidney, which is already burdened by the excretory demands of advancing pregnancy. He came to the conclusion that there was a definite relation between focal infection and toxemia of pregnancy, and stated "If this relationship can be established the dental profession will hold a place in the child-conservation movement and in prophylactic medicine unequaled by any other branch of medicine."

Bland and First³ raise the possibility of puerperal infection's resulting from the transfer of infectious material from the mouth to the genital tract by the patient's hands. Glanckopf⁴ believes that foci of infection may contribute to maternal mortality, and advises dental surgery whenever it is indicated during pregnancy. Galloway⁵ found that 15 per cent of 242 women had apical abscesses during pregnancy and advised removal of these foci of infection. He and Talbot both stressed the importance of x-ray examination in the demonstration of tooth disease.

DENTAL CARIES

The connection between pregnancy and dental caries is still debatable. Mull, Bill and Kinney⁶ studied prenatal cases and, like Galloway,⁵ found that 15 per cent had dental caries. They did not believe that there was a greater development of dental caries during pregnancy and the first few weeks of lactation than would be found in a group

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of nonpregnant women who were followed for the same period of time. They concluded that the average number of missing and carious teeth were proportional to the age of the individual rather than to the number of pregnancies.

Ziskin and Hotelling⁷ studied 324 pregnant women. By means of Bollecker's "caries index" they found that pregnancy does not incite dental caries. They observed that more teeth may be extracted during pregnancy than in the non-gravid state, but that the causes for extraction are not related to progress of tooth decay. They also believed that there might be some factors operating during pregnancy which actually prevented the development of dental caries.

Bland and First⁸ believe that the chief deleterious effect of pregnancy is to aggravate the dental caries already present rather than to produce caries in healthy teeth. Kerwin⁴ maintains that since the enamel has no blood vessels, calcium cannot be absorbed from the teeth into the blood stream to meet the demands of the growing fetal skeletal system. Schour, Chandler and Tweedy⁹ removed the parathyroid glands from rats. In those that survived over four months, repeated pregnancies and lactations failed to produce any histological evidence of calcium withdrawal from the calcified tissue of the teeth.

The exact cause of tooth decay is unknown. Alterations of the hydrogen ion concentration, carbohydrate fermentation, vitamin deficiency and disturbances of the calcium-phosphorus blood levels are considered possible etiologic factors. Of perhaps even greater significance is the factor of heredity, which naturally is difficult to evaluate. There is some evidence that good teeth are inherited by some family strains, while others have teeth that develop dental caries in spite of every prophylactic measure. If this is true, prenatal influences may be of some importance. It is therefore desirable for every pregnant woman to receive dietary and hygienic measures during the antepartum period, which will lay a good foundation for the proper development of tooth structures in the growing embryo. Since tooth structures are present by the end of the second gestational month and calcification is evident as early as the fourth month, therapeutic procedures should be carried out throughout the pregnancy. In fact, an ideal situation is one in which a woman undertakes a pregnancy only after a thorough dental survey has been conducted as a preconceptional measure, at which time the dental surgeon corrects all defects, so that the patient starts the pregnancy with sound teeth. It is then the problem of the obstetrician to institute the necessary dietary measures which will meet the demands of the in-

creased metabolism associated with pregnancy, and will supply the growing embryo with the foundation building materials which, if not present in adequate amounts, will be abstracted from the maternal tissues.

DIET DURING PREGNANCY

Not only must carbohydrates, proteins, fats, minerals and vitamins be present in liberal amounts in the diet of the expectant mother, but they must be assimilable. For instance, we know that even though there may be an adequate intake of calcium in the diet, rickets will develop during childhood if vitamin D is not available in sufficient amounts to promote absorption of calcium. There may be, and probably are, many other relations in metabolism similar to that of vitamin D and calcium.

Rosebury and Foley¹⁰ produced experimental evidence that pregnancy and lactation do not result in increased tooth decay, although bone calcification and the formation of new dentine is defective if the diet is deficient in calcium and vitamin D.

Agnew, Agnew and Tisdall¹¹ fed rats on diets low in phosphorus and vitamin D, this resulted in a high incidence of dental caries. The amount of calcium in the diet did not seem to influence the development of caries.

Howe¹² was able to produce decalcification of the teeth of guinea pigs by placing them on a diet deficient in anti-scorbutic factor, and to cure the process by feeding an adequate diet. He discovered that diets deficient in vitamin C resulted in a diminution of the amount of ash and calcium and an increase in the amount of magnesium in the teeth, even though the calcium in the diet was normal.¹³

Animal experimentation suggests that there is an increased demand for vitamins during pregnancy and lactation. Teel, Burke and Draper¹⁴ have shown that the fetus acts as a parasite on the mother, so that she needs appreciably greater amounts of vitamin C during pregnancy than she does during the non-gravid state. This increased maternal need for vitamin C was demonstrated to persist during lactation.¹⁵

It should be remembered that a well balanced diet built up around five main articles (meat, eggs, milk, vegetables and fruits) will supply the essential elements. One or two eggs daily will correct a deficiency of vitamin D. One quart of milk supplies 1.2 gm of calcium which is adequate for the normal demands (1 gm daily).

If the expectant mother is unable to drink milk and to eat proper amounts of green vegetables,

it becomes necessary to add calcium to the diet. During those months when there is little sunshine it is advisable to add some form of cod-liver oil, because of the beneficial effects of vitamin D in the promotion of absorption of calcium. If the diet is deficient in fruit juices, or if the patient has spongy gums which bleed easily, ascorbic acid is an essential therapeutic procedure.

As obstetricians and dentists become increasingly scientifically minded, there is a tendency to impart to the patient an impression that she is afflicted with a terrible disease, namely pregnancy. I should like to make a plea that we change our tactics and try to impress the pregnant woman with the idea that she does not have a disease but is simply experiencing a normal physiologic process. We can help to inculcate this attitude by the intelligent administration of vitamins and other necessary food articles when they seem to be deficient in the patient's diet, instead of blindly giving shotgun mixtures and supplying excessive amounts on the theory that if a little is beneficial a lot should do much more good.

The Council on Dental Therapeutics¹⁰ states that the addition of calcium and phosphorus in the presence of an adequate diet does not necessarily promote the development of sound teeth in the human fetus.

We have not yet properly evaluated the possible harmful effects of the administration of vitamins and minerals in excess of the bodily needs. Brehm¹⁷ believes that viosterol causes calcification of the placenta, which is greatly increased when there is an excess of calcium in the diet. Finola, Trump and Grimson¹⁸ demonstrated by roentgenograms increased bone density in babies born of mothers treated with dicalcium phosphate and viosterol. Let us, then, as physicians and dentists, cease to treat our patients empirically, and administer drugs only when they are needed.

ORAL HYGIENE

A clean mouth contributes to the comfort and health of the obstetric patient. Dental hygiene should be fully explained by the attending physician. The patient should be instructed to brush her teeth after each meal. The gums should be massaged with the toothbrush and the teeth should be brushed from the gums toward the biting surfaces. An alkaline mouthwash should be used after each brushing.

Dental hygiene is but one part of the general hygiene of pregnancy, and should be combined with such measures as fresh air, sunshine, exercise, rest, a clean body and a proper mental attitude on the part of the patient.

DENTAL SURGERY DURING PREGNANCY

The dental surgeon may safely perform during pregnancy any procedure which is indicated for the correction of tooth defects, but should first consult the attending obstetrician. Ordinarily it is unwise to perform dental surgery at that time of the month when the menses would occur if the patient were not pregnant, since this is the most likely time for abortion to occur. On the other hand, abortion following tooth extraction is exceedingly uncommon.

In general, dentists treat pyorrhea, fill cavities, drain abscesses, extract roots and cauterize polyps during pregnancy. The possible harmful effects of extracting teeth in order to eliminate foci of infection should be borne in mind, since this may spread the infection rather than eliminate it. Rowley,¹⁹ therefore, advises repeated examinations of the temperature, urine and leukocyte count during and following extractions in order to note reaction. He cultured the roots of devitalized teeth and consistently showed a positive growth of streptococci of either the viridans or hemolytic types.

The patient should not be subjected to prolonged exhausting operative procedures. If many teeth must be extracted it is preferable to carry this out in several stages.

Local anesthesia is preferable to inhalation anesthesia, although nitrous oxide may be used with comparative safety.

Since many obstetric patients now receive potent analgesic drugs during labor and inhalation anesthesia at delivery, it is increasingly important that there be no loose teeth or insecure fillings which can be inhaled into the air passages when the patient is under the effect of one of these drugs. Proper dental therapy will greatly diminish this danger.

SUMMARY AND CONCLUSIONS

Dentistry should be an essential part of prenatal and postnatal care.

Foci of infection about the mouth may in some cases have an etiologic bearing on the development of obstetric complications such as toxemia, pyelitis, mastitis, puerperal infection, cardiac decompensation and recurrent abortion.

A negative calcium-phosphorus balance and vitamin C and D deficiencies may have a deleterious effect on dental caries during pregnancy.

Dentists and obstetricians should prescribe calcium, viosterol, ascorbic acid and other essential elements when they seem to be lacking. There is no evidence that the administration of these substances in amounts in excess of the bodily needs

will have a beneficial effect on either the mother or the baby

Oral hygiene is an essential part of the general hygiene of pregnancy

Pregnancy is no contraindication to dental surgery. On the contrary, proper dental surgery may have a beneficial effect on the pregnancy

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A CLINICAL AND LABORATORY STUDY OF THE INCIDENCE OF FUNGI IN PATIENTS WITH CUTANEOUS ERUPTIONS*

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DURING the year from July 1, 1938, to July 1, 1939, 476 patients with cutaneous eruptions were examined at the Dermatological Clinic of the Boston City Hospital for the presence of fungi. The existence of fungous infection was definitely or remotely suspected in most of these patients. Scrapings were taken from the skin of these patients, not only at the site of the lesion but elsewhere, for example the feet. Direct microscopic examination of the scrapings from the lesions in cover glass mounts with 20 per cent potassium hydroxide and cultures on Sabouraud's medium were made. The cultural methods were the more informative, since they permitted the identification of species as well as that of genera. The value of direct microscopic examination was evidenced in cases infected with tinea versicolor, since the cultivation of the causative organism was unsatisfactory. Except in the sections of this report especially relating to cultures, the positive findings represent the results of the combined methods.

tures and 27.2 per cent by direct examination. Of the 179 cases with positive findings, both cultures and scrapings were positive in 94 (52.5 per cent), cultures were positive and scrapings negative in 47 (26.2 per cent), and cultures were negative and

TABLE 1. Direct Microscopical Examination versus Cultural Methods in the Detection of Fungi

| FUNGUS | POSITIVE FINDINGS | | |
|--------------------|-------------------|---------------------|-------|
| | NO. OF CASES | PERCENTAGE OBTAINED | COLOR |
| Microsporon | 4 | 96 | 80 |
| Trichophyton | 33 | 85 | 73 |
| Epidermophyton | 4 | 100 | 5 |
| Monilia | | | |
| <i>M. albicans</i> | 26 | 65 | 92 |
| Other species | 13 | 0 | 100 |
| Cryptococcus | 11 | 9 | 100 |
| Mycoderma | 7 | 0 | 100 |
| Malassezia | 11 | 100 | 0 |
| Total | 179 | | |
| A cases | | 4 | 79 |

scrapings positive in 38 (21.2 per cent). If cultures had been the only method used 141 positive results (78.7 per cent) would have been obtained and if microscopical examination only had been made, 132 (73.7 per cent) would have been found. These figures indicate the necessity of using both methods in the laboratory diagnosis of infections due to fungi.

The relative value of the two methods varied with the genus of the invading fungus as shown in Table 1. Infections by *Microsporon*, *Trichophyton*, *Epidermophyton* and *Malassezia* were

DIRECT MICROSCOPICAL EXAMINATION VERSUS CULTURES

Positive findings were obtained in 37.6 per cent of the 476 patients examined, 29.6 per cent by cul-

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more readily demonstrated by direct microscopical examination than by culture. The other genera of fungi shown in Table 1 were detected chiefly by culture. *Monilia albicans* was recognized in 92 per cent of the positive cases by culture and in 65 per cent by microscopical examination. The other species of *Monilia*, which probably play no important etiologic role, were detected only by culture. Infections with *Mycoderma* and *Cryptococcus* were recognized chiefly by cultural methods.

SEASONAL INCIDENCE OF FUNGI IN DISEASES OF THE SKIN

Table 2 gives the percentage of cases in which fungi were recognized by laboratory examination.

TABLE 2 *Percentage of Positive Findings of Fungi by Months*

| MONTH | TOTAL NO OF CASES | POSITIVE CASES NO | PER CENT |
|-----------|-------------------|-------------------|----------|
| 1938 | | | |
| July | 20 | 9 | 45.0 |
| August | 48 | 28 | 48.3 |
| September | 35 | 16 | 45.7 |
| October | 41 | 18 | 43.9 |
| November | 38 | 15 | 39.5 |
| December | 38 | 12 | 31.6 |
| 1939 | | | |
| January | 45 | 15 | 33.3 |
| February | 32 | 9 | 28.1 |
| March | 37 | 16 | 43.2 |
| April | 52 | 17 | 32.7 |
| May | 53 | 14 | 26.4 |
| June | 37 | 10 | 27.0 |
| Totals | 476 | 179 | |

tion, arranged by months. Of 476 cases, 179 (37.6 per cent) showed the presence of fungi. These fungi appear to be the etiologic agents, except possibly the species of *Monilia* other than *M. albicans* and the genera *Mycoderma* and *Cryptococcus*.

The seasonal distribution of the series has little

groups of three months so as to separate the summer-vacation period.

Tinea capitis (*Microsporon* infection) occurred almost exclusively in children. During the summer months the number of patients was about half as large as that during the other months, evidently because of the vacation period. *Tinea circinata* did not show a similar decline during this

TABLE 3 *Relation of Season and Temperature to the Percentage of Positive Findings of Fungi*

| PERIOD | PERCENTAGE OF POSITIVE FINDINGS | | | | | |
|---|---------------------------------|--------------|---------------|-----------------|-----------------|---|
| | MEAN TEMPERATURE (BOTTOM) | ALL DISEASES | TINEA CAPITIS | TINEA CIRCINATA | DERMATOPHYTOSIS | EROSIO INTERDIGITALIS, ONYCHOMYCOSIS AND PARONYCHIA |
| | °F | | | | | |
| Six warm months (May to November) | 63.9 | 40.6 | 88.8 | 82.6 | 56.5 | 70.6 |
| Six cold months (November to May) | 35.8 | 34.7 | 80.7 | 60.0 | 51.4 | 66.7 |
| Four very warm months (June to October) | 68.1 | 45.0 | 100.0 | 86.7 | 55.0 | 63.3 |
| Four very cold months (December to April) | 34.1 | 34.7 | 77.3 | 58.3 | 52.4 | 58.3 |

period. *Dermatophytosis*, due in the majority of cases to *Trichophyton*, was less prevalent during the coldest months, whereas *erosio interdigitalis* and other conditions of the hands due to *Monilia* had no seasonal variation.

The percentage of positive laboratory findings tended to increase during the warm weather. A comparison of the warm and cold months in Table 3 shows that during the warm weather there was a marked increase in the percentage of positive findings in *tinea capitis* and *tinea circinata*, and slight increase in *dermatophytosis* and in *erosio interdigitalis* and other hand infections.

TABLE 4 *Clinical Diagnoses and Positive Findings of Fungi*

| CLINICAL DIAGNOSIS | No OF CASES | POSITIVE FINDINGS | | MICRO- SPORON | TRICHO- PHYTON | EPIDER- MOPHY- TON | GENUS | | | | | MALAS- SEZIA |
|-----------------------|----------------|----------------------|-------------|------------------|-------------------|--------------------------|---|-------------------------------|-------------------|----------------|----|-----------------|
| | | NO | PER CENT | | | | MONILIA (<i>M. albi- cans</i>) | MONILIA (other species) | CRYPTO- COCCUS | MYCO- DERMA | | |
| Dermatophytosis | 98 | 54 | 54.6 | | 31 | | 2 | 8 | 9 | 4 | | |
| Tinea capitis | 49 | 41 | 83.7 | 41 | | | | | | | | |
| Tinea circinata | 48 | 34 | 70.8 | 33 | 1 | | | | | | | |
| Tinea cruris | 8 | 4 | 50.0 | | | 4 | | | | | | |
| Tinea versicolor | 11 | 11 | 100.0 | | | | | | | | | |
| Erosio interdigitalis | 23 | 17 | 73.9 | | | | | | | | 11 | |
| Onychomycosis | 8 | 4 | 50.0 | | | | 15 | 1 | 1 | | | |
| Paronychia | 4 | 3 | 75.0 | | | | 2 | 2 | | | | |
| Dermatitis contact | 215 | 7 | 3.3 | | 1 | | 3 | | | | | |
| Perleche | 1 | 1 | 100.0 | | | | 2 | 1 | 1 | 2 | | |
| Pityriasis rosea | 5 | 1 | 20.0 | | | | 1 | | | | | |
| Psoriasis | 5 | 1 | 20.0 | | | | | 1 | | | | |
| Intertrigo | 1 | 1 | 100.0 | | | | | | | 1 | | |
| Totals | 476 | 179 | | 74 | 33 | 4 | 1 26 | 13 | 11 | 7 | 11 | |

significance other than indicating a seasonal variation in the percentage of positive findings. More information is obtained when the prevalences of the four commonest diseases—*tinea capitis*, *tinea circinata*, *dermatophytosis* and the combined *Monilia* infections of *erosio interdigitalis*, *onychomycosis* and *paronychia*—are arranged in

THE INCIDENCE OF FUNGI IN CERTAIN SKIN DISEASES

The percentage of positive laboratory findings of fungi depends on the cutaneous eruption. Table 4 gives the percentage of positive examinations for several diseases commonly associated with fun

gous infections and the distribution of the fungi according to genera

Tinea capitis A high percentage of positive results (84 per cent) was obtained in this disease. All the fungi found were of the genus *Microsporum*. This disease is easily recognized clinically, which explains the high percentage of positive findings.

Tinea circinata Patients with this disease also yielded a fairly high percentage of positive results (71 per cent). With a single exception all the fungi were of the genus *Microsporum*.

Dermatophytosis Over half the patients (55 per cent) with dermatophytosis gave positive findings. Of the 54 fungi, 31 were of the genus *Trichophyton* and the remainder were of the genera *Monilia*, *Cryptococcus* and *Mycoderma*. Either laboratory methods were less effective in detecting fungi in this disease or the clinical diagnosis of dermatophytosis was wrong.

M. gypsum 1 and *M. lanosum* 42. The 24 positive cultures of *Trichophyton* consisted of the following species: *T. gypsum* 10, *T. purpureum* 6, and unclassified, 8. The 3 species of *Epidermophyton* were all *E. floccosum*. The 37 cultures of *Monilia* consisted of the following species: *M. albicans* 24, and unclassified, 13.

ANATOMICAL DISTRIBUTION OF FUNGI

The various cutaneous locations from which the fungi were obtained are arranged in Table 5 according to the genus of the fungus. The sources of the 179 positive findings were as follows: head, 29 per cent, body, 19 per cent, upper extremities, 26 per cent, and lower extremities, 26 per cent.

Fungi of the genus *Microsporum* were distributed thus: head, 67 per cent, body, 18 per cent, upper extremities, 12 per cent, and lower extremities, 3 per cent. Those of the genus *Trichophyton* were

TABLE 5 Anatomical Distribution of Fungi Isolated from Patients

| Genus | No. of Positive Findings | Head | | Body | | Upper Extremities | | Lower Extremities | |
|-----------------------|--------------------------|-------|------|------|------|-------------------|-------|-------------------|------|
| | | Scalp | Face | Body | Arms | Arms | Hands | Legs | Feet |
| <i>Microsporum</i> | 74 | 41 | 9 | 10 | | 3 | | 2 | |
| <i>Trichophyton</i> | 33 | | | | | 1 | | | 25 |
| <i>Epidermophyton</i> | 4 | | | | 4 | | | 3 | |
| <i>Monilia</i> | | | | | | | | | |
| <i>M. albicans</i> | 26 | | 2 | 1 | 1 | | 20 | | 2 |
| Other species | 13 | | | | | 1 | 5 | 6 | |
| <i>Cryptococcus</i> | 11 | | | | | 1 | 2 | 1 | 7 |
| <i>Mycoderma</i> | 7 | | | 11 | | | 4 | | 1 |
| <i>Malaissia</i> | 11 | | | | | | | | |
| Totals | | 41 | 11 | 23 | 5 | 6 | 34 | 12 | 35 |
| Grand totals | 179 | | | | 34 | | 46 | | 47 |

Erosio interdigitalis The interdigital lesions of the hands showed the presence of *Monilia* in 74 per cent of the cases. In 88 per cent of this group the lesions showed the presence of *M. albicans*.

Contact dermatitis The small number of fungi (3 per cent) obtained from patients with contact dermatitis—mostly old cases—indicates that secondary infection with fungi is not so frequent as one might expect from the literature. Known pathogens were detected in only 3 of 215 patients.

SPECIES OF FUNGI

Only those fungi isolated by culture were identified as to species. It was not always possible to determine accurately the exact species, owing to the lack of standard classification and to the difficulty of classifying the aberrant forms, which do not correspond exactly to established types. For this reason it has been necessary to list some of our cultures as unidentified species. No attempt was made to classify species of the genera *Cryptococcus* and *Mycoderma*.

The 60 positive cultures of *Microsporum* consisted of the following species: *M. audouinii*, 17,

obtained as follows: body, 3 per cent, upper extremities, 12 per cent, and lower extremities, chiefly feet, 85 per cent. *Monilia albicans* was found as follows: head (face), 8 per cent, body, 8 per cent, upper extremities (hands), 76 per cent, and lower extremities (feet), 8 per cent.

DISCUSSION

This type of study reveals several points worthy of comment.

A systematic examination of patients for fungi has a distinct value, since the finding of fungi, especially in the cases of contact dermatitis, may mean a great difference in prognosis and treatment. However, the finding of a pathogenic fungus in the skin of a patient showing a cutaneous eruption does not necessarily mean that the eruption is due to the fungus, since an occasional pathogen may be found on a normal skin.

Despite the fact that the routine of a large clinic necessitates the services of physicians who are only part-time dermatologists, the diagnosis of contact dermatitis as a disease distinct from fungous infection was 97 per cent correct. On the other

hand, in tinea capitis, in which the diagnosis should ordinarily be correct both clinically and culturally in 100 per cent of cases, it was impossible to demonstrate the fungi in 16 per cent of the patients, the result either of mistakes in clinical diagnosis or of faulty technic in obtaining laboratory specimens

The trend of dermatological diagnoses has changed. Today it is important to use both clinical and laboratory methods of diagnosis for diseases of the skin. With improved laboratory technic there will be fewer negative findings in mycotic infection, especially when the lesions are observed by those trained in their clinical recognition. The study of mycology in relation to cutaneous and systemic affections is of increasing value in the diagnosis, prognosis and treatment of these diseases.

SUMMARY

A statistical report is presented on the incidence of fungi in cutaneous eruptions at the Dermatological Clinic of the Boston City Hospital from July, 1938, to July, 1939.

Positive findings were obtained in 37.6 per cent of 476 patients in whom the existence of fungous infections was definitely or remotely suspected.

Two methods of laboratory diagnosis were employed: direct microscopical examination and cul-

tures. By the former method 73.7 per cent of the total positives were obtained, and by the latter 78.7 per cent. The relative value of the two methods depends on the genus of fungus concerned. Both should be used in the diagnosis of fungous infections.

The percentage of positive findings varies with the different diseases. Tinea capitis, tinea circinata and *erosio interdigitalis* give a high percentage of positives, and dermatophytosis a fair percentage. Contact dermatitis has an extremely low percentage, a finding which proves that secondary infection with fungi is more or less infrequent.

The incidence of tinea capitis, most prevalent in children, shows a seasonal variation, with a decline during the summer-vacation months. The cases of dermatophytosis decrease during the cold months.

The percentage of positive findings is highest in warm weather.

The 179 fungi comprised seven genera, of which the three commonest were *Microsporon* (41.3 per cent), *Monilia* (21.8 per cent) and *Trichophyton* (18.5 per cent).

The anatomical distribution of the lesions from which fungi were detected was as follows: head, 29 per cent, body, 19 per cent, upper extremities, 26 per cent, and lower extremities, 26 per cent.

REPORT ON MEDICAL PROGRESS

ABDOMINAL SURGERY

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MANY outstanding contributions have been made to the field of abdominal surgery during the past year. It will not be possible to discuss them all in this review. Some of them need further confirmation to prove their practical value, and may be mentioned in a later report. Although it will be necessary to consider some of the same organs or systems that were discussed in the previous report,¹ it is believed that this is justifiable on the basis of the frequency with which some of the conditions are met, and the better understanding that has come about concerning their management. Of necessity, such a report must be incomplete.

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PERITONITIS

More and more evidence has been collected indicating that peritonitis of severe and fulminating types, when not based on a continued leak into the peritoneal cavity from a hollow viscus, should in many cases be treated by a conservative regimen. If and when localization of the infectious process takes place, the abscess should be drained as early as its existence can be reasonably assured. This is particularly true in peritonitis associated with appendicitis. Cases appearing after full-blown peritonitis has developed from appendicitis are more safely treated on a conservative basis until localization is obvious. The abscesses — if they develop — should be drained be-

fore they have progressed to a point of intra abdominal rupture, since a secondary generalized insult to the peritoneal cavity is almost invariably fatal.

Rarely should the appendix be removed during the drainage of a localized abscess, but instead, secondary appendectomy should be planned at a subsequent date. Although of necessity the exact time for the removal of the appendix under certain circumstances must be variable, there has been a considerable tendency toward delaying this procedure too long. In some cases it is best to remove the appendix before the patient is discharged from the hospital, in others, the appointment for return for this operation should be between six and eight weeks after discharge. If delay is greater than this, a recurrence of the acute process may develop, with resulting secondary abscess formation, which will preclude appendectomy at the time of the second entry.

Various methods of combating acute peritonitis have been advocated. In early cases one may consider seriously the use of Steinberg's⁷ colibac trogen. It would appear that this product marshals the immune forces within the peritoneal cavity with much greater rapidity than does Nature. The work of Coller, Ransom and Rufe⁸ seems to support the efficacy of this agent. A better use for it might be considered when there has been gross contamination of the peritoneal cavity by accident during an operation on the colon. Experimental evidence indicates that this material may be of value, and apparently it offers considerable protection to experimental animals whose peritoneal cavities are contaminated purposely by the fecal stream. One must be careful, however, not to utilize any material of this sort as a substitute for carefully planned—two-stage if necessary—clean abdominal surgery when dealing with the colon. Other agents, such as the lyophilic serum now advocated by Bower,⁹ may prove useful. He has presented some evidence that the routine use of this serum in peritonitis reduces the mortality. Confirmation of this work is needed. Sul familamide in peritonitis has naturally been tried and recommended by some observers, the results as yet are not convincing, although further developments along this line and with this agent or some kindred chemical may prove of great value.

SUBDIAPHRAGMATIC ABSCESS

Faxon⁶ has recently reviewed this subject from the records of the Massachusetts General Hospital. The results of early diagnosis and adequate drainage are very convincing. Approach through the bed of the twelfth rib has been rewarded by a great lowering of the mortality. As Ochsner and

DeBakey⁵ pointed out in their original description of this method of drainage, one must be sure that the incision through the bed of the rib is not in the oblique direction of the rib but transversely to it and opposite the first lumbar transverse process. If this precaution is observed one can not enter the pleural cavity by accident. The advantages of being able to drain a subhepatic abscess by an extension of this incision, as well as the common right posterolateral space, are to be considered, since a high percentage of all subphrenic accumulations occur in these regions. Careful x-ray examinations, supported by injections of Lipiodol where a sinus is present, make it possible to localize the abscess accurately. The trans pleural route of drainage has been attended by a much higher mortality than has the lower approach.

THE BILIARY SYSTEM

There is still considerable controversy concerning the advisability of immediate or delayed operation in acute gall bladder disease. Evidence has been offered that supports both views. Recent contributions by Glenn¹ from the New York Hospital indicate that early operation is associated with a lower mortality than is delayed surgery, on the basis that a considerable number of gangrenous gall bladders perforate. On the other hand, Behrend,² of Philadelphia, offers considerable evidence that emergency operations on the gall bladder are hazardous, and that if they are undertaken the gall bladder should be drained and not removed. He believes that generalized peritonitis following perforation of the gall bladder is very rare, and that the local inflammations which may occur following a subacute perforation can be adequately treated if a less radical attitude is adopted. From the New York Postgraduate Hospital, statistical data by Hotz³ and Carter, Heyd and Hotz¹⁰ are of interest. This material has recently been summarized by Heyd.¹¹ He points out that patients who were operated on in the first six hours after admission to the hospital had a mortality rate double that of those operated on between six and twenty-four hours after admission. This would indicate that the patients may have had the process for a great many hours or, at times, days prior to admission. Preoperative dehydration seemed to be a definite factor in the high mortality. Those patients who had their dehydration combated were in a much better condition to withstand the operative procedure than were those operated on several hours after admission. It is interesting that most of the controversy which has been carried on has been on the basis of when the operation should be done in relation to

hospital admission rather than in relation to the actual duration of the acute process. A study is now being undertaken in order to ascertain, if possible, the safety of operation in acute gall-bladder disease on the basis of the duration of symptoms rather than on that of the hours after admission.

Coller and Jackson,¹² of Ann Arbor, have contributed the results of their study on the dextrose tolerance in gall-bladder disease; they believe that some cases which have been diagnosed previously as hyperinsulinism have, as a matter of fact, been those of hypoglycemia due to liver damage. They think that the longer acute gall-bladder disease exists, the more danger there is to the liver. They believe that dextrose-tolerance curves may be very valuable in determining the safety of operation, and that the sooner the liver is relieved of the burden of the inflammatory process of the acute gall bladder, the less likelihood there is of a fatality from liver damage.

Wilson,¹³ of Toronto, has offered a new method of repair of an injured common duct. This constitutes constructing a tunnel in the anterior wall of the stomach over a tube, the proximal end of which is secured in the stump of the injured common hepatic duct. Wilson's intention was to do a second operation in order to establish drainage from his new peritonealized tube into the stomach itself, but he found that drainage took place spontaneously. I have tried this method in one case, establishing the continuity through the gastric mucosa at the time of the primary operation. It only remains to be seen whether such a tunnel will contract and become as troublesome as most of the artificial ducts that have previously been made. In another case I cut across the jejunum and anastomosed it to the stump of the common hepatic duct, re-establishing continuity in the jejunum by an end-to-side anastomosis of the Roux Y type. This may be a better operation when possible, since the peristaltic current is away from the liver rather than toward it. I obtained the idea of using this type of repair from Whipple's¹⁴ article on two-stage resection for carcinoma of the head of the pancreas or duodenum.

Every conceivable precaution should be taken to prevent injury to the common and hepatic ducts during cholecystectomy. I still believe that in any gall-bladder operation—where, owing to the disease present, to the obesity of the patient or to adhesions of the duodenum in this region it is difficult to identify accurately the right and left hepatic ducts, the common duct and the cystic duct, as well as the cystic artery—the gall bladder should not be removed from the ducts toward the fundus. A reverse procedure, using artificial

edema in the wall of the gall bladder, will result in fewer accidents to the ducts in a large percentage of operations.

Wallace and I,¹⁵ have reported follow-up studies on patients with common-duct operations at the Massachusetts General Hospital for the last nine years. We found that the most reliable information, aside from jaundice, to indicate stone in the common duct is frequency of attacks. Of 66 patients who had attacks less than one week apart, 60 had stones in the common or hepatic ducts at operation, regardless of the size or thickness of the duct. Among 2088 operations on the extrahepatic biliary system in the last nine years, 775 patients had common-duct explorations—an incidence of 37.6 per cent. In the last four years, 20.7 per cent of these patients had stones in the common duct. Patients recorded as having had mud or detritus in the ducts were not classified with those who had had stones. Of the 775 patients with common-duct exploration, 561 had the papilla of Vater instrumentated. The average dilatation was 7 mm and was carried out by the graduated metal dilators of Bakes.¹⁶ There were no accidents coincident with the passage of these bougies through the papilla, such as ascending cholangitis, duodenal reflux or fulminating infection. There has been no evidence of subsequent cicatricial constriction of the duct outlet. Four of these patients returned with symptoms and had stones removed from the ducts. Of the 214 patients who did not have instrumentation of the papilla, 9 were reoperated on for stone, and 10 others continued to have symptoms thought to be due to stone in the duct or spasm of the sphincter of Oddi.

The dramatic effects of vitamin K on the hemorrhagic tendencies in jaundiced patients have now become standardized sufficiently for one to be assured of the permanent elimination of fatal hemorrhage in such cases. A synthetic substance in the form of a naphthoquinone derivative works much more quickly than does vitamin K obtained from natural sources, so that patients may be prepared for surgery much more rapidly. One of these synthetic products can be administered parenterally, with effectiveness, according to Stewart.¹⁷ In conjunction with the new substance, studies are being made regarding the prothrombin level in patients bleeding from lesions other than those produced by jaundice. In some cases of bleeding in ulcerative colitis and hypertrophic gastritis, the prothrombin level has been found low and the patients have responded to the administration of vitamin K. This substance is almost sure to prove a specific in hemorrhagic disease of the newborn.

GASTRIC AND DUODENAL ULCER

Increasing evidence is being accumulated as a warning against the early loss of symptoms and even against improvement in the roentgenological picture in gastric ulceration, since certain malignant ulcerations improve in this manner on a conservative regimen. Patients with gastric ulceration should be closely followed at frequent intervals until the lesion is entirely healed, else a certain number of malignant ulcerations will be overlooked. One must not rely on the presence of hydrochloric acid in the stomach as a guide to the benign character of the ulceration, since many cases of carcinoma of the stomach have a normal acidity, and occasional cases a high one. If a gastric ulceration is followed by the internist and roentgenologist at intervals of ten days, a decision regarding the need of surgery can be made within a month. It is better to resect a stomach for a benign ulcer than to overlook an ulcer with malignant degeneration. Serial sections of many gastric ulcerations will show cancer in small areas. Since this is the most curable type of gastric cancer, one should not be disappointed should the pathologist fail to find malignant disease in a lesion operated on because it had failed to respond as rapidly as one thought it should with conservative measures.

In subtotal gastrectomies for duodenal ulcer, it has become evident that one should not leave the mucous lining of the antrum of the stomach in situ. The presence of many deeply penetrating ulcers with marked inflammatory reaction involving the head of the pancreas and the region of the bile ducts, makes excision of this portion of the duodenum hazardous. For this reason, the so-called gastrectomy for exclusion has been popularized. When Finsterer¹⁸ first advocated this method of avoiding the extra risk of resecting a portion of the duodenum involved in a large inflammatory mass, he believed that if the antrum was left the mucosa should be removed from it. Other investigators have held the same opinion although, as time has passed, neglect to attend to this detail has caused a great many catastrophes. The mucosa of the antrum apparently contains an acid activating substance which stimulates an excess of acidity from any acid cells remaining in the unresected proximal portion of the stomach. Jejunal ulcers have been prone to follow this type of operation (gastrectomy for exclusion) when the entire antrum has been left behind. Ogilvie¹⁹ calls attention to this fact, and reports a very large percentage of jejunal ulcers in a small series of exclusion procedures. Graham²⁰ has had a similar experience. I have fallen into the same error, much to my regret, and have had to reoperate on

a few patients and remove the remaining antrum in order to produce permanent alkalinity in the proximal segment of the stomach. Incidentally, the removal of the mucous lining of the antrum makes the closure of the serous and muscular coats of this structure very much easier. It is possible that there may be an influence on acidity in addition to that coming from the mucosa of the segment. It is hoped that a series of experiments soon to be carried out at the Massachusetts General Hospital by Dr. Oliver Cope will prove this point one way or the other. So far, no patients who have had gastrectomy for exclusion plus the removal of the mucous membrane from the remaining antrum have developed jejunal ulcer.

I am impressed with the difficulty of performing gastric surgery on fat patients—not that the obesity interferes with the technical procedure but that the traumatized fatty mesocolon through which a posterior anastomosis is made is apt to produce a malfunctioning stoma. This is particularly true in secondary operations for a jejunal ulcer, since all these patients have been fed on such a high fat diet that they have large deposits of adipose tissue in their mesenteries. A large fat omentum makes it more difficult to perform an anterior anastomosis, since the mesentery of the jejunum is not long enough to go around the omentum and colon without tension. As the least objectionable method, I have on occasion divided the omentum from its border to the colon and brought the jejunum through this rent, with satisfactory results. In fat patients who have an obstructive lesion of a benign character at the pylorus, one should seriously consider pyloroplasty or gastroduodenostomy rather than a posterior gastroenterostomy. Walters²¹ has also recognized that obese patients with stomach lesions require special attention as regards the type of anastomosis done, and refers to 11 selected obese patients on whom he has operated.

Malfunctioning stomas are still a burden to any surgeon who attempts gastric surgery. Hoag,²² of San Francisco, advocates an operation which he calls jejuno-plasty. This necessitates exposing the original anastomosis sufficiently well to do a plastic procedure on the two limbs of the jejunum. This is done, much as in the Finney pyloroplasty, by using the two limbs of the jejunum instead of the duodenum and antrum of the stomach. Hoag reports several cases with good results, and believes that this procedure is more logical than any other yet devised. It may not have the hazard of stomal ulcer so common after enteroenterostomy, since the alkaline juices are not diverted from the line of anastomosis. Abbott and Rawson²³ describe a two-way tube to be used

in all anastomoses between the stomach and intestine. It has two compartments, one of which is supposed to drain the stomach contents to the outside by siphonage or suction, while the second passes on for quite a distance to the distal limb of the jejunum. This method has the advantage of enabling one to feed the patient through the long tube at an earlier date than one might without some such provision. The small holes in the portion of the tube that remains in the stomach are not entirely adequate to keep the stomach decompressed, and vomiting may take place in spite of the tube. It is possible that a larger tube with larger openings might obviate this disadvantage. Abbott and Rawson's tube may be particularly helpful from the standpoint of early feeding, but one very much questions whether it will solve the problem of some of the more serious grades of malfunctioning stoma. The average malfunctioning stoma will right itself in a period of seven to ten days if the serum protein can be maintained at a high level. The blood chemical findings must be carefully followed, and if there is no sign of material passing into the distal limb of the anastomosis by the end of ten days, something should be undertaken at once in order to keep nutrition at a proper level. Personally, I have found a jejunostomy for feeding to serve this purpose better than any other procedure. This must be done by exposing the distal limb of the jejunum accurately, either by reopening the original incision or by making a new one sufficiently wide for accurate exploration, since it is of the utmost importance to determine the exact loop of jejunum best suited to receive a jejunostomy tube. Ordinarily, this loop is at a point from 30 to 50 cm. below the stoma, and should be a coil that lies comfortably in the left flank. If one uses a No. 16 French whistle-tipped catheter for this purpose and holds it in place by two small purse-string sutures, the bowel will not be constricted sufficiently to interfere with fluid passing by this point, nor will there be quite so much danger of obstruction from other structures that become adherent to the area about the operative field. Placing a small bit of the left omentum, if it is available, between the bowel and the peritoneum is advantageous. The catheter should be brought out through a small stab wound in the left flank, and should have been accurately inserted for one third of its length into the distal limb of the bowel. Through such a tube one may return the aspirations from the stomach, along with desired food elements. Many nutritive solutions have been advocated, and the only necessary precaution is that the formula selected does not produce too much diarrhea. The diarrhea can be combated

by paregoric added to the feedings, as suggested by Graham.²⁰ The formula should contain a high content of protein, to which has been added a sufficient excess of the water-soluble vitamins. Patients under this regimen will hold their own, and in time the original stoma will function, thus furnishing the most ideal conditions for a permanent result. It is easy to become discouraged in some of these jejunostomies for feeding, since the patient may not gain in weight and it may be difficult to maintain the blood constituents at a normal level. Often about the time one thinks that some further operative procedure must be done in order to save the patient's life, the original stoma begins to function, and from that time on everything goes well. In 3 of my cases following a jejunostomy twenty-five to thirty-one days elapsed before the stoma functioned.

Anesthesia in gastric surgery is still a debated question, and Nupercaine (1:500) as a spinal anesthetic has gained in popularity. In localities or clinics where pulmonary postoperative complications are rare, this appears to be the ideal anesthetic. At the Massachusetts General Hospital, however, we have found that spinal anesthesia is followed by a fairly high percentage of pulmonary complications, so that we have continued to use novocain local and splanchnic block for gastric surgery. In several cases, by injecting a small amount of Evipal into the intravenous tube when the patient becomes tired or areas difficult to reach by local anesthesia are touched, we have caused the procedure to go smoothly and with little strain on both the surgeon and the patient. Also, it might be pointed out that when large quantities of novocain are used the barbiturates may be helpful as an antidote, in at least one case of novocain poisoning during gastrectomy, Evipal seemed to be a specific. Therefore, it would seem that its careful and guarded use as an adjunct to local and splanchnic block is justifiable. In a fairly large series of gastric operations done under local and splanchnic block, there have been no postoperative pulmonary sequelae. The patients have had a smooth convalescence, and few of the minor complications associated with general or spinal anesthesia have occurred. One death occurred that may have been due to novocain poisoning.

One of the most outstanding contributions of recent date is that of Pfeiffer²¹ on the management of gastrojejunal fistula. Reasoning that the poor nutrition of patients suffering from this condition was based on the fact that the fecal current came back into the stomach, rather than on a food loss due to the direct passage from the stom-

ach into the colon, he concluded that if the contents of the bowel could be shunted proximal to the stoma an improvement might be expected and a better and safer operative procedure could be eventually carried out on the original lesion. The results turned out much better than Pfeiffer had dared hope, his patients improved and gained weight. When a second operation was performed on the stoma three months later, the inflammatory reaction in the region of the fistula was very much less than usual. The shunting is accomplished by means of a complete right colostomy. This requires closure ultimately, but is a small price to pay for the added protection of a cleaner field in which to work. It is possible under these circumstances to do a subtotal gastrectomy with much greater safety at the time that the fistula is corrected.

CARCINOMA OF THE STOMACH

Livingston and Pack³² have published a small monograph on cancer of the stomach which has many interesting and surprising statistical tables. The authors compare the number of deaths in the United States from cancer of the stomach during the past fifteen years with those from highway accidents. According to their figures there have been 600,000 deaths during this interval from carcinoma of the stomach and 400,000 from highway accidents. They have also analyzed the figures from all clinics of large size where reports on this lesion have been published. The average five-year-cure figure for the country is only about 5 per cent. They point out that unless the effort is made no patient can be cured. The risk of gastrectomy may be high but this is the only procedure that offers any chance of cure. Clinics with high operative mortality in gastrectomy for cancer have on an average more five year cures from this disease than have clinics which show a low mortality. This seems to indicate that one should resect any stomach invaded by malignant disease which can be removed, regardless of the size or extent of the lesion, so long as the liver and peritoneum are not involved. Involvement of the lymph nodes is no contraindication to gastrectomy.

Parsons and Welch³³ have published a subsequent series of cases treated for carcinoma of the stomach at the Massachusetts General Hospital. They stress the importance of radical surgery for early lesions, and point out that of the few patients who have had resections for carcinoma in situ, all have lived over five years. An interesting and disarming feature is that patients who have had symptoms of a stomach disorder for one year or over have a much better chance for a five year

cure—if resection is possible—than do those who have had symptoms for six months or less. In other words, the rapidly growing lesion, although this may not be evident from pathological classification, may be suspected on the basis of duration of symptoms. These authors show that the resectability has been increased from 25 to 35 per cent, while the mortality from the operation has been reduced from 35 to 25 per cent during the second five year period reported on. They further point out that although there are more patients living for longer periods of time in their series than in Ogilvie's³⁴ they have the same percentage of living patients at the end of five years as he reports. One may well criticize palliative gastrectomy for cancer. The occasional cure and the frequently long respite as well as the psychological effect on the patient are important. Patients who have survived gastrectomy for cancer and die of recurrence have a more comfortable exitus than do those who die of starvation and nausea with the cancer unremoved.

So far, 38 total gastrectomies have been done at the Massachusetts General Hospital for cancer. These are discouraging cases in that the operative mortality was high and all the other patients eventually died of their disease. However, many long respites were obtained and a more comfortable exitus for those who survived the procedure.

Clute and Albright³⁵ have contributed a very important modification of the incision for high gastrectomy. They advocate a hockey stick incision which goes across the lower costal cartilages to the left of the midline. By dividing the costal cartilages, one gets a much better exposure of the region of the lower esophagus and diaphragm. We have found this type of incision extremely helpful in these high procedures.

ACUTE INTESTINAL OBSTRUCTION

McKuttrick and Sarris³⁶ have just reported the fourth series of cases with acute small-bowel obstruction from the Massachusetts General Hospital. The entire forty year period has been reviewed, the three previous decades were reported by Scudder,³⁷ Richardson³⁸ and McIver.³⁹ The use of the Miller Abbott tube in acute intestinal obstruction was critically reviewed in the most recent report. It was interesting to note that in all cases with acute small-bowel obstruction operated on within the first twenty-four hours of the disease, there were no deaths. The mortality rose sharply during the second twenty-four hours and reached 22 per cent. They state that, after forty-eight hours, it is obvious that more people will survive if a temporary conservative

regimen of intubation and emptying of the upper gastrointestinal tract is carried out. Patients thus become, after a period of twenty-four to seventy-two hours, better operative risks. McKittrick and Sarris recommend that a Miller-Abbott tube be passed as soon as a patient with acute small-bowel obstruction enters the hospital, a flat plate of the abdomen should then be taken in order to determine, if possible, the approximate location of the obstruction. If the patient has had symptoms for twenty-four hours or less, immediate operation should be undertaken. If symptoms have existed for forty-eight hours or more, conservative measures should be adopted. During the operation it is essential that continuous suction be applied to the Miller-Abbott tube, as the contents from the upper small bowel may continue to pass back into the stomach. This eliminates the danger of aspiration of stomach contents during anesthesia. The tube is left in place and kept there until the intestinal current is completely re-established. In patients operated on in the later stages, if the small bowel can be fairly decompressed by the Miller-Abbott tube prior to operation the hazard of operation is greatly reduced. As stated in the progress report¹ for last year, the use of iced drinks, as suggested by Dr. George W. Holmes, aids materially in getting the end of the tube through the pylorus.

FOREIGN BODIES IN THE GASTROINTESTINAL TRACT

DeBakey and Ochsner³³ have made an exhaustive study of foreign bodies within the intestine. They divide these into bezoars caused by the ingestion of hair, those produced by concretions—such as shellac—and another interesting type which they find very prevalent in the South and which is due to the ingestion of the fibrous portion of the persimmon—apparently the particles gather in a bolus which completely obstructs the lumen of the bowel. These authors also mention other forms of foreign bodies which produce obstruction, including masses of round worms. Gallstones may erode into the lumen of the bowel and produce the so-called gallstone ileus. It is generally the rule that these foreign bodies in themselves are not large enough to produce intestinal obstruction, but as they pass through the gastrointestinal tract become coated with solid

fecal matter, this often produces a concretion of sufficient size to cause obstruction. The commonest site of obstruction from foreign bodies is in the terminal ileum, since the small bowel gradually becomes narrower as the ileocecal valve is approached.

264 Beacon Street.

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., Editor

CASE 26071

PRESENTATION OF CASE

A twenty five year-old unmarried woman was admitted to the emergency ward complaining of abdominal pain of twenty hours duration

The patient stated that she was perfectly well during the day preceding admission she ate a hearty meal at 4 p.m. and then attended the cinema. Soon after returning home, however, at 11:00 p.m. she noticed the gradual onset of generalized, constant, abdominal pain which occurred with cramp-like exacerbations, and became steadily worse. At 3 a.m. she called her physician who prescribed pills "to make her vomit." This was successful in that she did vomit one hour later, with but slight relief. The pain continued unabated throughout the day of admission, but gradually became less severe in the afternoon a few hours before entry. The pain was then described as being steady, in the lower abdomen, sometimes more severe on the right side, sometimes on the left.

Her last catamenia began three days before admission, lasted only thirty six hours, and ended twenty four hours before the onset of the present illness. Characteristically her periods were regular occurred once every twenty six to twenty eight days, and usually lasted one week without dysmenorrhea. Prior to the last period there had been no previous aberration either in time, length or amount of flow. Bowel movements were described as being normal both before and during the present illness. There were no other symptoms. The family and past histories were non-contributory.

Physical examination revealed a well-developed and nourished woman who was experiencing acute abdominal discomfort. The abdomen was very slightly distended and tympanitic throughout, with slightly increased peristaltic sounds. There was tenderness with muscle spasm more marked in the lower abdomen especially on the right. Both the vagina and rectum were diffusely tender. No masses or fluid was noted. The heart and lungs were normal, and the remainder of the physical examination negative. The blood pressure was 124 systolic, 76 diastolic.

The temperature was 98°F., the pulse 110, and the respirations 25.

Examination of the urine was negative. The blood was normal except that there was a leukocytosis of 30,700.

A laparotomy was performed soon after admission.

DIFFERENTIAL DIAGNOSIS

DR. FRED A. SIMMONS. The first impression one gets from reading this history is that it was a surgical case and that the patient had an acute lesion in the abdomen, probably on the basis of ectopic gestation or appendicitis, both of which would demand operative interference. When one goes over the case again, however, the important findings are limited, I believe, to the fact that we have a twenty five year-old woman with abdominal pain and tenderness, a slightly rapid pulse and a markedly elevated white-cell count. In the absence of facts which do not appear in this record, one wonders why this patient needed to be operated on. I think if I had been called to see her or to discuss the case on the telephone without the advantage of my own physical examination, I should have said that she might have been observed for a while. I suppose it is fair to assume that the temperature was rectal because that is a routine procedure in the Emergency Ward. That might give some evidence that the patient was in shock. The pulse was slightly elevated and the respirations were elevated findings which might give us an inkling that she was experiencing air hunger. The problem assuming that it is a surgical emergency, resolves into two possibilities: sepsis in the peritoneal cavity and blood in the peritoneal cavity.

The past history of gastrointestinal symptoms is not contributory unless it rules out the possibility of her having had a gastrointestinal condition, with which I include appendicitis. She might have had a twisted ovarian cyst; this could account for the rapid pulse and the high white cell count but I should also expect fever. She might have had a ruptured dermoid cyst, which could have resulted in shock from the sudden discharge of necrotic material into the abdominal cavity. I am going to rule out gastrointestinal disease. If the history is correct, she might have had an ectopic gestation with the menstrual period limited to thirty six hours instead of one week. The history of the attack may be inaccurate and the menstrual history may not be a fact but I am going to rule out ectopic gestation in favor of a bizarre diagnosis, one I have not seen diagnosed preoperatively perhaps.

it is hazardous to make it. I believe that this girl who is unmarried and twenty-five and who, in my opinion, has blood in the abdominal cavity, had a chocolate endometrial cyst, which had become distended in association with menstrual flow and had eventually ruptured, thus resulting in a pelvis, if not an abdomen, full of bloody fluid.

DR FIORINDO A. SIMEONE: There is one bit of information, not in the record, which would have helped support Dr. Simmons's contention. We tapped the abdomen with an aspirating needle and obtained a few drops of bright-red blood. We were not certain this was coming from the peritoneal cavity, but we were reasonably certain there was no general peritonitis. She was operated on for the possibility of acute appendicitis or active bleeding into the peritoneal cavity.

She did have a ruptured left ovarian cyst, which we removed at operation. There was both clotted and free blood in the pelvis, indicating both old and recent bleeding.

CLINICAL DIAGNOSIS

Acute appendicitis?

Hemoperitoneum?

DR. SIMMONS'S DIAGNOSIS

Ruptured chocolate (endometrial) cyst of ovary, with hemoperitoneum.

ANATOMICAL DIAGNOSIS

Hemorrhagic pseudomucinous cystadenoma of the ovary, with spontaneous rupture.

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: The cyst in question was lined with tall columnar epithelium, of the type we see ordinarily with a pseudomucinous cyst. The hemorrhage was obviously very fresh, with no changed or blackened blood such as is seen in a chocolate cyst. So I think we can rule out endometriosis. Why a pseudomucinous cyst should have hemorrhage into it and should have ruptured spontaneously, I cannot answer. The ovary as a whole was not infarcted, so that I do not believe there could have been a twisted pedicle. All that we can say is that she had a spontaneous rupture of an adenocystoma of the ovary.

DR. FRANCIS T. HUNTER: Was there quite a bit of hemorrhage?

DR. SIMEONE: We estimated about a pint of blood, a large part of which was clotted.

DR. HUNTER: I should like to mention a test devised by Dr. Raymond H. Goodale, of Worcester, which is helpful in the question of bleeding into the abdominal cavity. He finds that if

blood is taken in a dry syringe, preferably in duplicate from both antecubital veins, the normal individual's serum diluted to 1:17 no longer gives a positive guaiac test. If a lot of blood is being absorbed in the abdominal cavity, the test may be positive up to 1:50. The same may occur if there is much trauma or bruising.

DR. EDWARD B. BENEDICT: You can also diagnose hemoperitoneum very easily with the peritoneoscope.

CASE 26072

PRESENTATION OF CASE

A fifty-nine-year-old married Greek salesman was admitted complaining of backache and paralysis of the legs.

The patient had been perfectly well until two weeks prior to admission, at which time quite severe backaches developed in the lower dorsal and upper lumbar spine. There were no sharp pains, and the pain radiated to both sides. A diagnosis of "lumbago" was made, and the back strapped on two occasions without effect. About five days before entry the patient began to notice weakness in both legs, which rapidly progressed during the next three days to complete paralysis of both lower extremities. Numbness was present in both of them. He became unable to void but at no time had been incontinent. There was no history of trauma. He had always been constipated, but of late the constipation had increased to such an extent that cathartics were required. On a few occasions he had passed black stools, but no gross blood. The patient had had no headaches, vertigo, syncope or eye symptoms. He had not lost weight.

He was born in Greece but had lived in the United States for forty-five years. He had not been exposed to tuberculosis.

Physical examination revealed a well-developed and nourished man in no distress but unable to move his legs. The chest examination was negative. The blood pressure was 130 systolic, 85 diastolic. Abdominal and rectal examinations were negative. Examination of the spine was negative except that the patient complained of pain on motion in the region of the third and fourth lumbar vertebrae. Both lower extremities were without motor power. The knee jerks were active but not hyperactive. Scratching of the feet caused a mass reflex. The Babinski signs were weakly positive, and the cremasteric reflexes were absent. The upper abdominal reflexes were present, the lower ones absent. Sensation was absent over the legs and thighs to just above the groin in front and below the first lumbar nerve in back.

The bladder was paralyzed, and the anal sphincter weak.

The temperature was 98.6°F, the pulse 80, and the respirations 18.

Examination of the urine was negative. The blood showed a red-cell count of 4,040,000 with 75 per cent hemoglobin, and a white-cell count of 11,500 with 89 per cent polymorphonuclears, 7 per cent lymphocytes, 3 per cent mononuclears and 1 per cent eosinophils. The nonprotein nitrogen of the serum was 30 mg per 100 cc., and of the whole blood, 43 mg. A blood Hinton test was negative. A lumbar puncture showed an initial pressure of 120 mm. of water, no rise occurring even with combined jugular pressure. The spinal fluid was xanthochromic and contained 1 lymphocyte and 14 red cells per cubic millimeter. The total protein was 618 mg per 100 cc., and the gold sol curve 225554422, the Wassermann test was negative.

An x-ray of the dorsal and lumbar spine showed extensive spur and bridge formation about the margins of the bodies of the dorsal and upper lumbar vertebrae but no evidence of bone destruction. Lipiodol injected into the lumbar canal met a complete block opposite the body of the twelfth dorsal vertebra. The filling defect was an irregular point, more pronounced on the posterior and right sides. There was a questionable irregularity of the pedicle of the twelfth dorsal vertebra. X-ray films of the chest were negative.

On the third hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

Dr. J. J. MICHÉLSEN Applying the old rule I shall first try to determine the site of this lesion. We are told by the patient that there was weakness in both legs which progressed rapidly to complete paralysis. On examination this was confirmed. There was a complete paraplegia of the legs. This paralysis was of the upper motor neuron type. There were positive Babinski signs and marked weakness, findings which indicate that the spinal centers for the leg movements were released from the cerebral control of the fibers carried in the pyramidal tracts. Other significant signs were the absence of lower abdominal reflexes, the presence of the upper ones and a sensory level, presumably for all forms, at the first lumbar segment. On the basis of these motor reflex and sensory disturbances, the lesion ought to be localized in the cord at the twelfth thoracic segment. There seems to be a complete transection of the cord at that level. Bladder paralysis, which is a sign of complete transection at any level, furnishes additional evidence for that pre-

sumption. Weakness of the anal sphincter cannot very well be explained on that basis and may be caused by some other process not related to the lesion here. The history also tells of constipation rather than of the fecal incontinence that would ordinarily go with weakness of the sphincter. But this point is of minor importance.

Surprisingly the x-ray findings after the injection of Lipiodol do not seem to confirm the clinical localization. There was a complete block opposite the body of the twelfth thoracic vertebra, the filling defect more pronounced on the posterior and right sides. This is a two-fold discrepancy. The level of the Lipiodol block was lower than that of the transection, and the block was more pronounced on the right side, a point which did not come out in history or findings. The level of the block corresponds with the upper sacral cord segments while the transection has to be localized at the twelfth thoracic segment opposite the ninth thoracic vertebra.

What type of lesion could give a mechanical block at one level and transection of the cord at another? The commonest lesions causing a complete block are tumors. There are intradural and extradural tumors. Intradural tumors arise within or outside the cord. The inconsistency of clinical and Lipiodol signs in this case may be in favor of such a lesion. In the pre-Lipiodol era the mistake of localizing a tumor too high was often made in intradural lesions. But everything else in our case is against this diagnosis. Even if for some reason or another the sensory examination could not be done accurately enough to bring out dissociation of the different types of sensation the history suggests that this diagnosis is not correct, inasmuch as a fairly acute onset is very unusual in cases with intradural tumors. The complaints about pain did not seem to correspond to segmental distribution so intradural tumors within and outside the cord probably can be ruled out.

Extradural lesions that cause block may arise from the dura, the structures in the epidural space or the vertebrae. There was vertebral disease in this case,—extensive spur and bridge formation about the margins of the bodies of the dorsal and upper lumbar vertebrae—but this spondylitis deformans cannot explain the neurological picture. There was no bone destruction. This rules out tuberculosis, osteomyelitis, syphilitic lesions of the vertebra and particularly tumor metastases. One point in the history should be mentioned, namely, that the patient had passed black stools on a few occasions. However, gastrointestinal cancers very rarely metastasize into the vertebrae, the common

primary tumors which do this are those of the breast, prostate and thyroid gland. On top of that the history tells us that the patient had not lost weight, and this would not fit into the picture of a tumor of the gastrointestinal tract with metastases to the spine.

Could it be a lesion of the epidural space? This was my first impression, and it still seems to me to be the best bet. This was based on certain features in the history and the inconsistency of the clinical findings and the Lipiodol block. Epidural lesions are apt to give a fairly rapid progression of symptoms. They extend farther up and down than do other tumors, and may cause circulatory disturbances with symptoms distant from the site of the block.

Epidural lesions which may cause block are tumors and inflammatory processes. In children the commonest tumor is sarcoma. In adults we look for granulomas, myelomas, hypernephromas and tumors due to echinococcus disease. The infectious tumors are tuberculous, syphilitic and pyogenic in nature. There is little evidence in the history and findings to support the diagnosis of any one of these, with one exception. Possibly the blood picture will give us a lead. The white count was increased, and there was a polymorphonucleosis. Since there was no evidence of systemic infection, these changes in the blood picture may indicate that the process in the epidural space was of pyogenic origin. On this basis we come to a diagnosis of an epidural abscess, and indeed the history and some of the findings are consistent with this diagnosis. Occasionally, epidural abscesses occur without any preceding bone or systemic infection. This patient's story of pain could be quite typical, pain on motion is consistent, but whether or not there was tenderness is not mentioned. There was no increased temperature, and no leukocytosis in the spinal fluid—both factors somewhat against this diagnosis.

Summarizing, I should say that this case presented a clinical picture of transection of the cord at the twelfth thoracic segment and a Lipiodol block at the upper sacral segments caused by an epidural lesion. The type of this lesion cannot be determined with accuracy. Some features are

consistent with an epidural abscess, others are not. Another distinct possibility is epidural tumor.

CLINICAL DIAGNOSIS (PREOPERATIVE)

Extramedullary malignant tumor, compressing the cord at the twelfth thoracic segment

DR. MICHELSEN'S DIAGNOSIS

Epidural disease with transection of the cord
Epidural abscess?
Epidural tumor?

ANATOMICAL DIAGNOSIS

Plasma-cell myeloma of eleventh thoracic vertebra, with intraspinal, epidural extension

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. Opinion on the wards was in essential agreement with that of Dr. Michelsen. It was believed that the patient had a transverse myelitis due to pressure from some intraspinal but probably extradural mass. Although the probabilities seemed somewhat in favor of a tumor, the failure to demonstrate positive evidence of cancer locally or elsewhere in the body made exploration obligatory. Dr. James C. White centered his operation at the level of the eleventh thoracic vertebra. As soon as the laminae were exposed it was evident that they had been extensively infiltrated by tumor. The right one in particular was very soft and rongueured away with extreme ease to reveal a dense plaque of tumor tissue covering the dura. A frozen section was reported "highly malignant tumor, probably carcinoma." Further exploration showed extension of the tumor in both directions, hence the laminae of the tenth and twelfth thoracic vertebrae were removed in order to give adequate decompression, and a portion of the tumor was cut away. There was no intradural extension. Better sections from the fixed material showed that the tumor was a plasma-cell myeloma rather than metastatic carcinoma. Following operation, no treatment was instituted, though with little optimism since most myelomas are relatively radio-resistant. Up to the time of his transfer to a cancer hospital there had been no detectable improvement.

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PREMARITAL EXAMINATIONS

A PREMARITAL blood test for syphilis is a valuable procedure of modern preventive medicine. If positive, it serves to prevent infection of the prospective partner and provides an opportunity for adequate treatment of the infected individual, thus decreasing the possibility of bearing syphilitic children and of the later development of serious forms of the disease. A law to compel this procedure should not be necessary, but seven states have so legislated. That these laws have resulted in the discovery of 3300 cases of syphilis is indicated in an article by Dr. R. A. Vonderlehr in this issue of the *Journal*. The fact that by this discovery many individuals have been prevented from having the disease amply justifies the procedure. Such laws have engendered much discussion, and an able presentation of both sides of the question¹

has recently appeared in the *Journal of the American Medical Association*.

But the blood test alone is not enough. There is need for equal emphasis on physical examination, for the blood may not be positive in the early and infectious lesions of the primary stage, in certain partly treated cases or in the late stages of the disease. At the same time, evidence of the reliability of blood tests for syphilis is accumulating. Dr. Vonderlehr points out that modern serological tests properly performed will detect from 80 to 90 per cent of all cases of syphilis, with a very small percentage of false positives. The perfection of these tests has been largely due to the efforts of the Committee on Evaluation of Serodiagnostic Tests for Syphilis, which has conducted evaluation tests since 1935. It is vitally important that such tests be performed in all laboratories in accordance with the highest standards of excellence, which demand strict adherence to proved techniques. To accomplish this object the United States Public Health Service has published a manual of revised techniques.² In this handbook the originators of the tests have prepared detailed directions of how to conduct these procedures.

As with any laboratory procedure, physicians must interpret the report, realizing that a single positive report does not always mean syphilis and that a single negative report does not exclude syphilis. There should be an adequate physical examination, and a re-checking of all those with positive reports or with a history or manifestations suggesting syphilitic infection. Adequate provision for the follow-up of such individuals is essential for complete success.

Premarital blood-test laws will undoubtedly be enacted in other states in response to public demand. It is imperative that physicians and the public health authorities develop the necessary measures for the control of conjugal and congenital syphilis so that the individual and the community may reap the fullest benefits of medical knowledge accumulated over a period of years.

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A STUDY OF ALCOHOLISM AND ITS ASSOCIATED PSYCHOSES

LAST fall, the Research Council for the Advancement of Science approved a program for attacking the problem of alcoholism and the psychoses incident thereto. Grants of financial aid for this movement have been made by three organizations: one by the Carnegie Corporation for a survey of all work done to date on the effects of alcohol on human beings, sponsored by the Department of Psychiatry of the College of Medicine of New York University, and under the supervision of Dr Norman Jolliffe, another by the American Philosophical Society for a study of the toxic factors of alcoholism, to be conducted at the New York Psychiatric Institute under the direction of Dr George A Jervis, and the third by the Dazian Foundation for Medical Research to carry forward research work on the role of alcohol in liver cirrhosis, which will be performed at the College of Medicine of New York University. These studies will continue through 1941 and are designed to fill any gaps in investigations hitherto conducted and to stimulate further research in the problems involved. The information acquired will be published after the completion of these studies.

Dr Karl M Bowman, chairman of the council and director of psychiatry at Bellevue Hospital, has pointed out that the long-range objective of the council is to discover the etiology of alcoholism and better methods for its prevention and treatment. He believes that this disease and the incidental psychoses constitute one of the great public-health problems of modern times, particularly because no systematic attack on this menace to health comparable with those relating to tuberculosis, cancer, syphilis and heart disease has been attempted.

Since alcoholic beverages of one form or another will always be demanded by the inhabitants of this country, since they are now generally procurable and since voluminous advertisements of the distillers and brewers are alluring, existing conditions present a challenge to preventive and therapeutic medicine, for it is generally acknowledged that alcohol, where improperly used, has toxic properties

Social, economic and political questions relating to the use of alcohol have been topics for discussion since the early history of mankind but are not included in the program outlined by the council. In 1932 a book was published under the title of *Alcohol and Man*. This was edited by Haven Emerson, M.D., Henry A. Christian, M.D., Reid Hunt, M.D., Arthur Hunter, LL.D., Charles C. Lieb, M.D., Walter R. Miles, Ph.D., and Ernest G. Stillman, M.D. It was regarded as the last word on the subject from a medical standpoint and was intended to consider many of the problems included in the plan of the new council. Articles in this book were contributed by three of the editorial group and twenty others, including practitioners, pathologists, psychiatrists and statisticians, all holding important positions in their respective fields. Even so, the progress of medicine has been so rapid in recent years that it is reasonable to expect that up-to-date contributions to the recorded facts and conclusions of six years ago may increase our knowledge and lead to organized efforts directed toward the prevention and control of alcoholism. That it is a matter of vital concern is beyond doubt. The *Journal* has published articles relating to the problem from time to time, thus demonstrating an appreciation of its importance and a concern in the sentiment that it should be dealt with through a well-organized public-health program.

MEDICAL EPONYM

BARANY TEST

The caloric test was described by Robert Bárány (1876-1936), then assistant to Adam Politzer in the otological clinic at the Royal University in Vienna, in an article entitled "Untersuchungen über den vom Vestibularapparat des Ohres reflektorisch ausgelosten rhythmischen Nystagmus und seine Begleiterscheinungen [Studies in the Reflex Rhythmic Nystagmus and Accompanying Phenomena following Stimulation of the Vestibular Apparatus of the Ear]" published in the *Monatschrift für Ohrenheilkunde* (40: 193-297, 1906). The translation of a portion of the article is as follows:

I have systematically investigated the nystagmus occurring when the ears are syringed, and have observed several previously unknown effects. I use only Hartmann's attic syringe, introducing it close up to the in-

tact drum, or if the drum is perforated directly into the perforation, or where total destruction exists as the result of radical operation clear up to the wall of the labyrinth. The water to be used is drawn into a No. 110 Politzer bag the temperature having been noted. The bag is connected with an attic syringe by means of a rubber tube 75 cm. in length. The syringe having been introduced into the canal it is held in place with one hand and the patient's face is turned toward the operator. An assistant compresses the bag. The phenomena which I have observed are as follows: If the right ear is syringed with water lower than body temperature while the head is held erect, there occurs a nystagmus to the left, predominantly rotatory, but nearly always with a horizontal component. This is strongest when the eyes are directed toward the left weakest toward the right. This nystagmus occurs when the vestibular apparatus is intact even when the drum is unbroken. The lowest temperature required was 12 C. The nystagmus lasts for about one and one-half to two minutes. If water warmer than body temperature is used, nystagmus occurs in a direction opposite to that following the injection of cold water. That is on syringing the right ear nystagmus, predominantly rotatory is directed to the right and is most marked when the eyes are turned right. With intact drums, however nystagmus even after the highest tolerable temperature (51 C.) is often not very marked.

R W B

MASSACHUSETTS MEDICAL SOCIETY

RAYMOND S. TITUS, M.D. *Secretary*
330 Dartmouth Street
Boston

SECTION OF OBSTETRICS AND GYNECOLOGY*

FATAL SEPSIS FOLLOWING NORMAL DELIVERY

Mrs K., a twenty four year-old primipara, entered the hospital in labor on February 8 1934. Owing to language difficulties, no history whatever was obtained. She had apparently received no antepartum care.

Examination showed a well-developed and nourished woman. The temperature was 98.4°F., the pulse 82. The blood pressure was 110 systolic 60 diastolic. The heart sounds were clear and regular, there were no murmurs. The lungs were clear throughout and of uniform resonance. The pregnancy appeared to be at full term, with the fetus lying in an OLA position. The fetal heart rate was 142, and the sounds were clear and regular. Rectal examination showed the os one finger dilated and the head well engaged.

Labor progressed rapidly to a normal delivery

four hours later. The baby, a girl weighing 7 pounds, 8 ounces, was in good condition. The placenta was expressed twenty five minutes later, some difficulty was experienced in delivering the placenta, but it appeared to be intact on examination. The uterus contracted well, and there was no excessive bleeding.

The first three days of the puerperium were uneventful. The temperature remained normal, and the pulse rate never rose above 84. On the evening of the third day the temperature rose to 100.0°F. The patient complained of a cough and a little pain in the right chest. Examination showed nothing to account for the symptoms. There was some dysuria, and examination of a catheter specimen of urine was done, which showed a slight trace of albumin, a slight reaction of Benedict's solution and a sediment containing innumerable pus cells. The temperature remained elevated. The blood showed a white cell count of 22,000. Physical examination was negative, there was no tenderness over the kidneys. Urinary antiseptics were given, but with out effect on the temperature.

On the seventh postpartum day the patient passed several blood clots and the lochia became somewhat foul, there was also a piece of tissue which resembled decomposed placenta. The temperature, however showed no downward tendency following the expulsion of this material.

On February 17 nine days post partum, the temperature was 102.4°F., the pulse 102, the hemoglobin 35 per cent, the red-cell count 1,500,000 and the white-cell count 18,000. A blood culture was taken and yielded *Streptococcus haemolyticus*. The lochia was still slightly foul and a small piece of macerated placenta was removed from the cervix. The uterus was somewhat subinvolved but the vaults were free. A transfusion of 500 cc. of citrated blood from a compatible donor was given. Following transfusion both temperature and pulse dropped. The temperature remained normal for forty-eight hours, and the pulse was below 100.

On the twelfth postpartum day the temperature again jumped to 103.4°F. The white-cell count was 36,000 and the red-cell count 1,660,000. A second transfusion of 500 cc. of citrated blood was given. The following morning the temperature dropped to normal but rose to 105.0°F. in the evening and never again fell below 102.0. The pulse rose steadily, and the general condition declined. Vomiting occurred and distention appeared. Daily intravenous administrations of glucose were given to keep up the body fluids. The patient failed steadily, became delirious and later coma rose. The pulse could not be felt a few hours

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

before death on February 25, seventeen days post partum. There was no autopsy.

Comment This is an interesting case of proved hemolytic streptococcus infection. It did not appear quite so early after delivery as such infections usually do. In view of the fact that some placental tissue was retained, it is barely possible that the infection was superimposed. The appearance of pus in the urine, in view of the positive blood culture, is suggestive of a renal infection of hematogenous origin. The uterus was left alone, the patient was treated very conservatively. Because of the marked anemia two transfusions were given. One does not expect that a high temperature will drop to normal and remain so for forty-eight hours from transfusion alone. Probably the drop in temperature following the second transfusion was merely characteristic of the infection and had nothing whatever to do with the transfusion itself, as the temperature immediately rose to 105.0°F and remained elevated until death. Chemotherapy—the use of sulfanilamide—might have been curative. There is no record that a uterine culture was taken, but in the presence of retained and infected placental tissue the inference is that the infection entered through the uterus.

ANNUAL PRIZE FOR INTERNS

The attention of interns in Massachusetts hospitals is called to the fact that a prize of \$50.00 has been offered by the Massachusetts Medical Society for the best written and most comprehensive case report submitted by one of their number holding an internship in any Massachusetts hospital which is approved by the American Medical Association for intern training during 1938–1940.

This report is to be typewritten, and when completed is to be sealed, unsigned, in a plain envelope, which in turn is to be placed together with a separate slip bearing the name and address of the contestant, in a larger envelope, and sent to Committee on Medical Education and Medical Diplomas, Massachusetts Medical Society, 8 Fenway, Boston.

The contest this year closes May 5, 1940. Reports may be submitted at any time prior to that date.

DEATHS

CHENEY—ROBERT C. CHENEY, M.D., of Boston, died February 8. He was in his forty-sixth year.

Born in Brookline, the son of Dr. Frederick E. Cheney, he attended Noble and Greenough School and Harvard University and received his degree from the Harvard Medical School in 1919. He served internships at the Massachusetts General Hospital and the Massachusetts Eye and Ear Infirmary.

Dr. Cheney was a fellow of the Massachusetts Medical Society, the American Medical Association and the New England Ophthalmological Society.

His widow, his mother and a brother survive him.

THOMPSON—CHARLES A. THOMPSON, M.D., of Newton, died February 3. He was in his sixty-eighth year.

Born in Upper Sackville, New Brunswick, he received his degree from the College of Physicians and Surgeons, of Baltimore, and took a postgraduate course at the Harvard Medical School before he started practice.

He was a member of the Massachusetts Medical Society, the American Medical Association and the Newton Medical Club.

His widow, three daughters, three sons and a brother, Dr. James B. Thompson, of Needham, survive him.

MISCELLANY

SPONTANEOUS PNEUMOTHORAX

Older writers, having observed that spontaneous pneumothorax was sometimes followed by arrest of pulmonary tuberculosis, were tempted to regard this phenomenon as one of nature's haphazard attempts to cure. The serious results, however, far outweigh the occasional beneficial results—spontaneous pneumothorax is a traumatic accident to be avoided if possible. Recent studies directed toward the underlying cause of spontaneous pneumothorax are reawakening interest in the subject and those of Charr (Spontaneous pneumothorax. *Am Rev Tuberc* 40:565–570, 1939) are of particular interest.

Ten cases of fatal spontaneous pneumothorax are reported. All cases were in the third and fourth decades of life, 6 were in men and 4 in women. Eight had pulmonary tuberculosis and 2 anthracosis.

In all, the onset of the pneumothorax was sudden, and it occurred while the patients were in bed. In none of the cases severe coughing, sneezing or any other form of physical exertion preceded the fatal accident. The chief complaints were dyspnea and pain in the same side of the chest as the pneumothorax. All showed cyanosis, clammy skin, weak pulse, dry mucous membrane of the mouth with thirst and apprehension of impending death.

At necropsy, it was found that in 7 of the cases the pulmonary rupture was in the midaxillary aspect of the upper lobe, and in 3 it was on the anterior surface about the midclavicular line. In 2 of the latter group the rupture was in the upper lobe and in 1 in the lower lobe. In all the perforation was either in the front or the axillary region of the lungs—in none on the posterior surface of the lung.

In 3 cases with the rupture on the anterior surface of the lungs, the perforation took place through the center of large and acutely caseous tuberculous nodules, measuring about 1.5 cm. in diameter. The visceral pleura covering them was thin and transparent without adhesions to the adjacent parietal pleura. Following the ruptures deeper into the lungs led into irregularly shaped and acute cavities in the center of caseous consolidation. The cavities varied in size and were located in the anterior half of the lungs. Projecting into the cavities were several stumps of bronchi and many cord-like structures criss-crossing the cavities, which on section proved to be the remnants of lung tissue. Excursion of the air through these bronchial stumps was free. When the air was rapidly pumped into the main bronchi, the perforated visceral pleura covering the caseous nodules ballooned out remarkably. The surface distribution of the caseous tubercles in these 3 cases was interesting. Practically all the acutely caseous tubercles were on the anterior portions of the lungs.

The posterior parts showed principally congestion and areas of gelatinous pneumonia.

In 7 cases with the ruptures in the axillary region the character of the ruptures differed from those already described. In none did the perforation take place through the center of caseous tuberculous nodules as in the previous cases. There was much pleural thickening about the ruptures. The tuberculous which was present in all excepting 2 anthracosislike cases was chronic in form with considerable fibrosis throughout the lungs. Although there were scattered caseous tubercles, many of them showed on histological examination fibrous capsules surrounding them. Furthermore none of these cases showed superficial tubercles as acutely caseous as those in the first 3 cases.

It seems that the immediate cause of the pulmonary rupture in these 7 cases may have been tugging on the pleural adhesions. There is considerable vertical excursion of the lungs due to the greater depth of the costophrenic angle at that point. The sliding motion of the lung upon the inner surface of the thorax is probably most marked along the axillary aspect of the chest which if that is the case, accounts for the marked tugging movement in the pleural adhesions along the axillary region.

The absence of pulmonary rupture on the posterior aspect of the lungs confirms the belief that the cause of spontaneous pneumothorax is largely a mechanical one. The front and the axillary portions of the thorax move more in respiration than the posterior parts where the ribs are attached to the spinal column. These factors of chest movement may be more pronounced when a person lies on his back.

The left side is more frequently involved than the right, the percentage being approximately 60 on the left and 40 on the right. Various theories have been advanced to account for left-sided preponderance but there seems to be no doubt that the heart action produces an additional pulmonary mobility on the left side.

Spontaneous pneumothorax occurs in diseases other than tuberculosis. In the author's present series, 2 cases had far advanced anthracosislike uncomplicated by tuberculosis. In one of these there were large emphysematous blebs in the midaxillary region of the upper lobes rupture of which very likely produced the pneumothorax. Over these blebs the visceral pleura was considerably thickened, but the microscopical examination of the walls of the blebs showed extreme thinning of the elastic layer and at several points there was an actual breach to the continuity of the elastic lamina. In the other case the perforation of the lung was due to an extension of a cavity located in the center of a large anthracosislike mass in the right upper lobe.

Morphological changes of shock and related capillary phenomena were noted. These changes were marked diffuse congestion of capillaries and venules, especially in the lungs, liver and kidneys. Many of the alveolar spaces were filled with edematous fluid, and the capillaries were filled with blood. Supportive treatment usually employed in shock, in addition to withdrawal of air from the pleural space, which of course, is most important may be of value. Wrapping the patient with blankets, giving hot drinks and oxygen and the intravenous administration of fluid may be helpful though Moon has warned that too much heat produces peripheral vasodilatation and loss of body fluid in the form of perspiration which may aggravate shock. — Reprinted from *Tuberculosis Abstracts* (February 1940)

NOTES

Fourteen men have been granted traveling fellowships fellowships and scholarships, totaling \$8650 by the Harvard Medical School it was recently announced at Harvard University. These awards, for the coming academic year are as follows: Edward Hickling Bradford Fellowship to Walter R. MacLaren of Williamstown Massachusetts; John White Browne Fellowship to Samuel Lewis, D.M.D. 35 of Rosedale New York; William O. Moseley Jr., Traveling Fellowship to Paul C. Zamecnik, M.D., 36 of Cleveland Ohio; Jeffrey Richardson Fellowship to Sinclair H. Armstrong Jr., M.D. 37 of New York New York; Whitman Fellowship and Dr. William Hunter Workman Fellowship to Nathan B. Talbot, M.D. 36 of Brookline Massachusetts; Dr. William Hunter Workman Fellowship to Nathaniel B. Kurnick, M.D., of Brooklyn, New York; James Jackson Cabot Fellowship to Hubert W. Smith, M.D., of Dallas Texas; DeLamar Student Research Fellowships to William R. Christensen, M.D. of Salt Lake City Utah; Henry S. Fuller, M.D. of Washington District of Columbia; John W. Kirklin, M.D. of Rochester Minnesota; and Irving M. London, M.D. of Malden Massachusetts; Charles Eliot Ware Memorial Fellowship to Herbert R. Morgan, M.D. of Bell California; George Cheyne Shattuck Memorial Fellowship to Thomas H. Weller, M.D. of Ann Arbor Michigan; John Ware Memorial Fellowship to Joseph M. Foley, M.D. of Dorchester Massachusetts.

Dr. S. Walter Ranson, professor of neurology and director of the Neurological Research Institute at Northwestern University since 1928 has been appointed Edward K. Dunham Lecturer at the Harvard Medical School for the current academic year. He will deliver a series of lectures on March 4, 6 and 8 which are open to all interested professional persons.

At the annual reunion dinner of the Boston University School of Medicine Alumni Association, Dr. Milo C. Green of Boston a member of the twenty-five year class, was elected president. The other officers chosen were as follows: vice-presidents Dr. Harold L. Leland of Lowell and Dr. John M. Wilcox, of Woburn; secretary, Dr. Frank E. Barton, of Boston; treasurer, Dr. Harold W. Ripley of Braintree; directors (for three years) Drs. Rudolph Jacoby and Samuel N. Vose of Boston.

CORRESPONDENCE

MIDDLESEX ALUMNI FUND

To the Editor—The Graduate Association of Middlesex University School of Medicine has complied with Part I of the new fund contract as set down in the stipulations of Dr. Elliott P. Joslin. There is on deposit in cash at the Boston Safe Deposit and Trust Co. more than the \$30,000 required as of February 1, 1940.

H. L. MUGRAVE, M.D., *President*
M. L. KRAFT, M.D., *Secretary*

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

To the Editor—In addition to the articles enumerated in our letter of December 6 the following have been accepted:

Abbott Laboratories

- Sterile Solution Thiamin Chloride—Abbott, 250 mg, 5 cc bottle
- Sterile Isotonic Solution Thiamin Chloride—Abbott, 100 mg, 10 cc. bottle
- Tablets Thiamin Chloride—Abbott, 6 mg

Cutter Laboratories

- Sobisminol Mass—Cutter
- Sobisminol Mass—Cutter, capsules
- Sobisminol Solution—Cutter
- Sobisminol Solution—Cutter, 1 cc ampules
- Sobisminol Solution—Cutter, 2 cc. ampules

Eli Lilly & Company

- Combined Diphtheria Toxoid Tetanus Toxoid, Alum Precipitated, two 1 cc vials package
- Combined Diphtheria Toxoid Tetanus Toxoid, Alum Precipitated, one 10 cc vial package
- Sobisminol Mass—Lilly
- Pulvules Sobisminol Mass—Lilly
- Sobisminol Solution—Lilly
- Sobisminol Solution—Lilly, 1 cc ampules
- Sobisminol Solution—Lilly, 2 cc. ampules
- Sobisminol Solution—Lilly, 50 cc. ampules

E R Squibb & Sons

- Sobisminol Mass—Squibb
- Sobisminol Mass—Squibb, capsules
- Sobisminol Solution—Squibb
- Sobisminol Solution—Squibb, 1 cc ampules
- Sobisminol Solution—Squibb, 2 cc ampules
- Sobisminol Solution—Squibb, 50 cc ampules
- Epinephrine in Oil—Squibb

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,
Chicago, Illinois

REPORTS OF MEETINGS

NEW ENGLAND PATHOLOGICAL SOCIETY

At a meeting of the New England Pathological Society at the Peter Bent Brigham Hospital on November 16, Dr Sidney Farber introduced Dr Paul R. Cannon, professor of pathology at the University of Chicago, who spoke on 'The Relation of Flocculating Antibodies to Tissue Hypersensitiveness and Localized Disease'

Dr Cannon and his collaborators set out to determine whether a true correlation existed between the intensity of local tissue reaction in the Arthus phenomenon and the titer of circulating antibodies. Opie, who had done most of the competent earlier work in this field, believed that the tissue injury was a local anaphylactic process whereby the vital organs were spared a general anaphylactic shock. Although he never made any final statement due to his inability to obtain consistent correlation between the intensity of the local reaction and the antibody titer, Opie was aware that the demonstrated precipitins were not necessarily the same as the demonstrable ones, and felt that there probably did exist a true correlation of the two factors in the Arthus phenomenon. Culbertson, by employing the gravimetric method of Heidelberger and Kendall which measures antibody content rather than titer, did find a direct parallelism between the skin reaction and the amount of antibody. Several reputable workers, however, had been unable to corroborate this work and were of the opinion that tissue hypersensitivity was more permanent than precipitin formation and that there

was no direct relation between the two factors. Two reasons for the contradictory results, Dr Cannon concluded, lay in the use of the unreliable method of antigen dilution for titrating the antibody and in the use of complicated protein antigens.

Consequently, the precepts were laid down in Dr Cannon's work that a pure protein, such as crystalline egg albumen, and a reliable method for determining the amount of antibody should be employed. The method consisted of adsorbing the antigen on collodion particles and of testing the agglutination of these particles by using the centrifugalization and resuspension method. The amount of resuspension is inversely proportional to the amount of antibody present. By this method, a direct correlation between the Arthus reaction and the content of circulating antibodies was consistently found. The sensitivity of the method was demonstrated by detecting precipitins in serum where none could be found by antigen-dilution tests. The use of desensitizing doses of antigen caused a disappearance of the skin reaction, whereas the precipitins have never been found absent. On the other hand, in passive sensitization the removal of precipitins by adsorption on egg albumen caused a concomitant fall in the intensity of the skin reaction.

As further support for his theory of a direct correlation between the local manifestation and the general antibody content, Dr Cannon cited the oft repeated experiments on the injection of various organisms into non immune and immune animals, with the characteristic findings at the local site. An interesting additional experiment cited was that of Frisch, who had shown that the number and character of pneumococci in the sputum reflect the status of the circulating antiserum.

In summary, Dr Cannon made a plea for further study of the early effects of flocculating antibodies. He stated that it was their presence and that of precipitins which, together with the increase in phagocytes, promote tissue sensitivity and offer protection. A second function of these antibodies is their role in the fundamental mechanism for mobilizing and destroying foreign parenteral proteins in order to maintain the integrity of the host's protein. Occasionally their adverse effects are manifest due to toxic by-products which cause serum sickness, allergy and so forth. Dr Cannon emphasized that such untoward events do not signify that the mechanism is fundamentally faulty, for although the organism may at times be harmed or destroyed, the phenomenon in its fundamental form is protective for the race.

Dr Valy Menkin opened the discussion by suggesting that the content of antibody in the tissues might conceivably differ from that in the circulation. In regard to the mechanism of the local reaction, he stated that any non specific infection will be fixed at the local site by the process of inflammatory fixation through the presence of lymphatic blockage. This would be reinforced by the precipitation of the antigen antibody complex. He mentioned the Koch phenomenon as an example of local reaction without antibodies. By the use of a concentrated urea solution, he had been able to dissolve the fibrin barrier and to prevent the local fixation, even in the immune animals. He questioned whether the use of such a reagent, together with the antigen injected, might not cause precipitation of the complex to occur in the blood or vital organs with a general rather than local anaphylaxis.

Dr Tracy B. Mallory stated that he did not believe the Arthus phenomenon was a prototype of hypersensitivity and immunity as a whole. The rabbit is a good antibody producer and an animal in which a good Arthus

reaction can be obtained, whereas the guinea pig is extremely poor in both regards, although easily made hypersensitive. In the latter absence of antibodies is demonstrable not only by direct measurement but by failure of passive transfer to prove effective.

Dr. Louis Dienes stated that in guinea pigs the histologic changes develop at the site of reinjection before the appearance of precipitins in the circulating blood and before the animal is sensitive to anaphylaxis. He concluded that in various species a different phase of hypersensitivity may be predominantly developed. In man it is the pre-anaphylactic phase, while in the rabbit a later phase which corresponds to the Arthus phenomenon is highly developed. Results obtained in studies on the Arthus reaction in rabbits do not necessarily apply to those in human beings.

Dr. Cannon replied that his main purpose was to improve the method for studying the problem. In answer to Dr. Menkin he stated that the difference suggested was merely one of time and that the inflammatory fixation might be inaugurated by the antigen-antibody reaction. In rebuttal to Dr. Mallory's criticism Dr. Cannon stated that a good Arthus reaction and measurable antibody content had been obtained in guinea pigs by carefully helping them to survive the early period of dangerous anaphylaxis. He said that another reason for variations in such reactions as the tuberculin test is the presence of multiple antigens of varying diffusibilities. In regard to its human application the speaker cited one case of a massive Arthus reaction with elevated precipitins in a child who had received diphtheria antitoxin. There have been twelve such reports. Furthermore, it has been shown that the effect of the injection of foreign serum in the human beings is inversely proportional to the intensity of the local reaction.

Dr. Cannon concluded that all the reactions of hypersensitivity may prove fundamentally the same if proper methods are used to minimize the apparent variation of results.

ALPHA OMEGA ALPHA LECTURE

On November 17 the Harvard Chapter of Alpha Omega Alpha, with John Hickham presiding had Dr. A. Elvehjem, professor of biochemistry at the University of Wisconsin, as the guest speaker. The title of his talk was "The Biological Significance of Nicotinic Acid." In reviewing the historical background of the vitamin B complex, the speaker called attention to the fact that nicotinic acid unlike the other components, is a well-known compound of relatively simple chemical structure. It was first obtained in 1867 by Huber who oxidized nicotine, while Funk in 1912 crystallized it from yeast. The latter found it useless in combating fowl polyneuritis but showed it apparently favored digestion and growth. No other biological significance was attached to nicotinic acid until Warburg and Euler demonstrated in 1935 its relation to coenzymes.

As for pellagra it was not until 1930 that Goldberger definitely established that the disease was caused by a food deficiency which he identified as being the heat-labile component of vitamin B. It was in that same year that these investigators, as well as Spies, demonstrated that the value of liver extract as a source of this substance was even greater than that of brewers' yeast. Dr. Elvehjem used chicks instead of the resistant rat and showed that the pellagra-like disease could be cured with liver extract minus riboflavin while the latter alone was not efficacious. It was soon demonstrated, however that this was no true pellagra and that the preventive factor

was a substance closely allied with nicotinic acid—namely pantothenic acid. This led to the adoption of black tongue in dogs as the disease of choice in experimentation and it was shown by the group at Wisconsin as well as by others, that riboflavin was not the effective component in liver extract.

The importance of nicotinic acid in the prevention and cure of pellagra in all its manifestations has been amply proved by many investigators, notably by Spies. The stomatitis, dermatitis, diarrhea and vague complaints of ill-being all disappear under appropriate therapy. Satisfactory improvement has also been claimed in non-specific stomatitis, gastrointestinal dysfunction and central nervous-system disorders. Many of the patients with the latter symptoms however require additional substitution therapy and invariably do better when the nicotinic acid is accompanied by other members of the vitamin B complex and this probably holds for many other cases of pellagra the speaker stated. It was suggested that nicotinic acid be used only in emergencies and that all pellagrins be put on adequate diets, possibly supplemented by this substance.

Dr. Elvehjem then discussed the distribution of nicotinic acid in tissues. There was considered to be no accurate chemical method for assaying the amount of material present. So far as bio-assay was concerned, it was determined that the most satisfactory animal was the dog and the response of canine black tongue has been the indication of potency used by Dr. Elvehjem. Estimating the daily human requirement of nicotinic acid as 25 mg., it was calculated that one should eat 100 gm. of fresh liver or about half a pound of lean meat which was found to contain about half as much of this factor as liver. The only substances supplying sufficient nicotinic acid in one feeding to elicit a response in canine black-tongue were animal tissues and yeast.

In order to determine the efficacy of related compounds, various pyridine derivatives were tested both in the dog and by bacterial growth. The results indicated that only the acid, the amide and those compounds capable of conversion by simple processes within the body to these specific chemical structures were capable of substitution. The use of pyrazine compounds in human pellagra has been favorably reported by Spies, but Dr. Elvehjem has found their effects to dogs to be evanescent. He suggested that these substances could probably replace nicotinic acid from the more vital tissues and that the ultimate failure of response was indicative of a replacement of all available nicotinic acid from these sources.

The toxicity for animals has been demonstrated to be very low but the occurrence of heat and angling in the human being treated with as little as 20 mg. is a real and constant manifestation of its action. The speaker advised however that therapy should not be curtailed on account of these transient symptoms which do not prove dangerous to the patient's eventual prognosis.

The function of nicotinic acid seems to be intimately associated with coenzymes "1" and "2" which were shown to contain the compound. Euler reported a decrease in the cozymase content of deficient rats, but these were not considered uncomplicated deficiencies. Dr. Elvehjem, using Euler's method, demonstrated essentially the same values for the dog and rat despite the definite difference in clinical response to a lack of nicotinic acid. Furthermore, the blood content was equivalent in both healthy and deficient dogs. Vilter and Spies on the other hand found the blood values by a different method to be decreased in pellagrins while Knhn found no difference in the diseased state but an increase on feeding nicotinic acid.

On assay of the tissues, however, Dr Elvehjem did find a constant decrease in the cozymase content of the liver and muscles of deficient dogs. The use of purified cozymase supplied by Euler gave essentially the same results. Since these were the tissues richest in the coenzyme, it was suggestive that herein might lie the cause of the symptoms. An attempt to correlate the cozymase and nicotinic acid content of the same tissues resulted in only suggestive findings, but Dr Elvehjem attributed at least part of the difference to the use of an extraction method for cozymase which has subsequently been vastly improved and also to the fact that coenzyme "2" accounts for part of the nicotinic acid.

In summary, Dr Elvehjem stated that a better understanding of the pathologic physiology involved would offer an opportunity for the diagnosis of preclinical pellagra and consequently its better preventive treatment.

NOTICES

REMOVAL

DUNCAN E. REID, M.D., announces the removal of his office from 171 Bay State Road, Boston, to 319 Longwood Avenue, Boston.

BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library, 8 Fenway, Boston, on Monday evening, February 19, at 8:15. Dr. Robert B. Osgood will talk on "Menders of the Maimed."

All those interested in the subject are cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, February 21, from 2 to 4 p.m. Drs. Marshall N. Fulton and J. Englebert Dunphy will speak on "Itching."

Physicians and students are cordially invited to attend.

THE GUILD OF ST. LUKE

A regular meeting of The Guild of St. Luke will be held at the Hotel Puritan, Boston, on Monday evening, February 19, at 8:30. The members of The Guild of St. Apollonia are invited to attend this meeting. Mr. Constantine E. McGuire, of Washington, D.C., will be the guest speaker, his subject being "Some of the Factors Likely to Affect the Trend of the Fifth Decade of the Century."

BOSTON DOCTORS' SYMPHONY ORCHESTRA



The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concertmaster with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every

Thursday at 8:30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at 'The Hut,' on Friday afternoon, February 23, at 4:00. Dr. Lowrey F. Davenport will talk, his subject being "Suppurative Disease of the Lung."

NEW ENGLAND ROENTGEN RAY SOCIETY

The next meeting of the New England Roentgen Ray Society will be held at the Boston Medical Library on Friday, February 16, at 8:00 p.m.

PROGRAM

Case presentations Drs. W. J. Butler, R. D. Clapp, M. I. Smedal and L. K. Sycamore

Non Medical Uses of Roentgen Rays Dr. W. J. Elliott

Archaeology and Roentgenology Dr. F. T. Hunter

Dinner at the Harvard Club will be served at 6:30 p.m.

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The New England Society of Physical Medicine will hold its next meeting at the Hotel Kenmore, Boston, on Wednesday evening, February 28, at eight o'clock.

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Children's Hospital, Monday, February 26, at 8:15 p.m.

PROGRAM

Follow up Study of Ligated Ductus Arteriosus Cases.

Drs. John P. Hubbard and Robert E. Gross.

Limit of the Normal P-R Interval in Children. Dr. Charles H. Cutler

So-called "Congenital Idiopathic Hypertrophy" Dr. Hyman Green

Paroxysmal Tachycardia and Its Treatment in Young Infants. Dr. John P. Hubbard

Interested physicians and medical students are invited to attend.

NEW ENGLAND HEALTH INSTITUTE

The New England Health Institute, sponsored by the Connecticut State Medical Society, the United States Public Health Service, the United States Children's Bureau, the New England Tuberculosis Association, the state departments of health of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, the schools of public health of Yale University, Harvard University and Massachusetts Institute of Technology, Simmons College, the Connecticut State Nurses' Association and the Connecticut Public Health Association, will be held at Hotel Bond, 230 Asylum Street, Hartford, Connecticut, on April 15-19, 1940. A preliminary program will soon be available. Those desiring detailed information should apply to the Connecticut State Department of Health, 165 Capitol Avenue, Hartford.

THE FOUNDATION PRIZE

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons announces that the annual Foundation Prize for this year will be \$150. Those

eligible include only interns, residents or graduate students in obstetrics, gynecology and abdominal surgery and physicians who are actively practicing or teaching obstetrics, gynecology or abdominal surgery.

Competing manuscripts must be presented in triplicate under a non-deplume to the secretary of the association before June 1 be limited to 5000 words and such illustrations as are necessary for a clear exposition of the thesis and be typewritten (double spaced) on one side of the sheet, with ample margins.

The successful thesis must be presented at the next annual (September) meeting of the association without expense to the association and in conformity with its regulations.

For further details, address Dr. James R. Blox, Secretary 418 Eleventh Street, Huntington West Virginia.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY FEBRUARY 18

SENECA F O Y 18

4 p.m. The Medical Care of Domestic Pets. Dr. Gerrit W. Schnelle. Free public lecture. Harvard Medical School, amphitheater of Building D.

4 p.m. Hysteria and Asthma. Dr. Walter S. Burrage. Illustrated, public, health lecture. Fulkner Hospital auditorium.

MONDAY FEBRUARY 19

8:15 p.m. Members of the Maimed. Dr. Robert B. Osgood. Boston Medical History Club. Boston Medical Library.

8:30 p.m. Some of the Factors Likely to Affect the Trend of the Fifth Decade of the Century. M. Constantine E. McGraw. The Guild of St. Luke. Hotel Puritan, Boston.

TUESDAY FEBRUARY 20

9:10 a.m. Paralytic Agitation. Dr. H. I. Harris. Joseph H. Pratt Diagnostic Hospital.

12 m. The Common Diseases of the Veins. Dr. Edward A. Edwards. New England Medical Club. Boston Tuberculosis Association, 554 Columbus Avenue, Boston.

WEDNESDAY FEBRUARY 21

9:10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

2-4 p.m. Ichthyosis. Drs. Marshall N. Patton and J. Englebert Dunphy. Peter Bent Brigham Hospital.

FRIDAY FEBRUARY 23

9:10 a.m. Epidemiology of Respiratory Infections. Dr. Dwight O'Hara. Joseph H. Pratt Diagnostic Hospital.

SATURDAY FEBRUARY 24

9:10 a.m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

Open to the medical profession.

FEBRUARY 16—Staff meeting. United States Marine Hospital. Page 244 issue of February 8.

FEBRUARY 16—New England Roentgen Ray Society. Page 234.

FEBRUARY 16—Public lecture. Salem Hospital. Page 104 issue of December 28.

FEBRUARY 17—Free public lecture. Quincy City Hospital. Page 77 issue of January 11.

FEBRUARY 20—Lawrence Cancer Clinic. Page 244 issue of February 8.

FEBRUARY 22—All in One. New York University College of Medicine. Page 244 issue of February 8.

FEBRUARY 24—American Orthopsychiatric Association. Page 957 issue of December 14.

FEBRUARY 23—Staff meeting. United States Marine Hospital. Page 284.

FEBRUARY 26—New England Heart Association. Page 284.

FEBRUARY 28—New England Society of Physical Medicine. Page 284.

FEBRUARY 29—Nu Sigma Nu Lecture. Page 244 issue of February 8.

MARCH 2, 1939—American Board of Ophthalmology. Page 19 issue of November 2.

MARCH 9—New England Hospital Association. Hotel Statler, Boston.

MARCH 14—Pennsylvania Association of Physicians. 8:30 p.m. Hotel Statler, Philadelphia.

MARCH 15-17—American Association for the Study of Gonorrhea. Page 203 issue of February 1.

MARCH 15-19—New England Health Institute. Page 284.

APRIL 4-26—Scientific Session. Academy of Physical Medicine. Hotel J. A. Marshall, Richmond, Virginia.

MARCH 10-18—American Scientific Congress. Page 1043 issue of December 28.

MARCH 13—United States Pharmacopoeial Convention. Page 202, issue of February 1.

MARCH 7-9—American Board of Obstetrics and Gynecology. Page 1019 issue of January 15.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MARCH 6—Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcus Infections. Dr. Champ Lyons. Lynn Hospital, Lynn.

APRIL 3—Addison Gilbert Hospital Gloucester.

MAY 8—Annual meeting. Salem Country Club, Peabody.

FRANKLIN

MARCH 12—Franklin County Hospital, Greenfield.

MAY 14—Franklin County Hospital, Greenfield.

HAMPSHIRE

MARCH 13.

MAY 8.

Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Uxbridge Country Club, Needham.

MIDDLESEX NORTH

MARCH 24.

JUNE 31.

OCTOBER 30.

NORFOLK SOUTH

MARCH 7.

APRIL 4.

MAY 2.

All meetings, with the exception of one which is usually held at the Quincy City Hospital, are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

MARCH 21—Goodland Hospital, Brockton.

APRIL 18—State Farm.

MAY 16—Lakewood Sanatorium, Lakewood.

SUFFOLK

MARCH 27—Scientific meeting. Symposium on Ulcerated Colitis and Dysentery. Under the direction of Dr. Chester M. Jones.

APRIL 24—Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

MAY 2—Censors meeting. Page 244 issue of February 8.

WORCESTER

MARCH 13—Worcester Memorial Hospital.

APRIL 10—Worcester Mahernan Hospital.

MAY 8—Worcester Country Club.

Each meeting begins with a dinner at 6:30 p.m. and is followed by business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

Medical Care. Vol. VI. No. 4. *Law and Contemporary Problems*. 182 pp. Durham, North Carolina: Duke University School of Law, 1939. 75c.

The Dream World. A survey of the history and mystery of dreams. R. L. Mégron. 319 pp. New York: E. P. Dutton & Co., Inc., 1939. \$2.50.

The Inter Relationship of Mind and Body. The proceedings of the Association. New York, December 27 and 28, 1938. Vol. XIX of a series of research publications of the Association for Research in Nervous and Mental Disease. 381 pp. Baltimore: Williams & Wilkins Co., 1939. \$6.00.

Sexual Pathology. A study of derangements of the sexual instinct. Magnus Hirschfeld. Revised edition. 368 pp. New York: Emerson Books, 1940. \$2.95.

Diverticula and Diverticulitis of the Intestine. Their pathology, diagnosis and treatment. Harold C. Edwards. 335 pp. Baltimore: Williams & Wilkins Co., 1939. \$5.00.

Argyria The pharmacology of silver William R Hill and Donald M Pillsbury 172 pp Baltimore Williams & Wilkins Co, 1939 \$2.50

The Therapeutics of Internal Diseases Edited by George Blumer In two volumes. 1914 pp New York and London D Appleton Century Co, 1940 \$10.00 each volume

A Handbook of Accepted Remedies Symptoms and treatment of poisoning diagnostic procedures, miscellaneous information Edited by P J Hanzlik. Third edition. 127 pp San Francisco Department of Public Health, 1940 \$1.00

On Oxidation, Fermentation, Vitamins, Health and Disease Albert V Szent Gyorgyi 109 pp Baltimore Williams & Wilkins Co, 1939 \$2.00

Manual of Fractures, Dislocations and Epiphyseal Separations Harry C W S de Brun. 468 pp Chicago The Year Book Publishers, Inc, 1939 \$3.00

New Facts on Mental Disorders Study of 89,190 cases Neil A Dayton 486 pp Springfield, Illinois, and Baltimore Charles C Thomas, 1940 \$4.50

Handbook of Orthopaedic Surgery Alfred R. Shands, Jr In collaboration with Richard B Raney Second edition 567 pp St. Louis C V Mosby Co, 1940 \$4.25

Congenital Cleft Lip, Cleft Palate and Associated Nasal Deformities Harold S Vaughan 210 pp Philadelphia Lea & Febiger, 1940 \$4.00

BOOK REVIEWS

Pye's Surgical Handicraft A manual of surgical manipulations, minor surgery, and other matters connected with the work of house surgeons and of surgical dressers Edited by Hamilton Bailey Eleventh edition 512 pp Baltimore Williams & Wilkins Co, 1939 \$6.00

For a book appearing in its eleventh edition, a review is necessary only to increase the number of those who may glean as much nourishment of a practical nature as did the reviewer. Truly valuable, this book is a veritable gold mine of ideas and facts of diagnostic and therapeutic value. As a tribute to its present editor, it is fitting to say that when one reads about a simple, homely, but extremely valuable therapeutic trick one wonders whether it was the brainchild of the original Mr Pye or the equally original but more modern Hamilton Bailey. Mr Bailey discusses "The Treatment of Acute Poisoning" in so simple, yet complete a manner that the entire subject at last resolves itself into common sense. He has added many valuable steps in the care of fractures. His pre-operative and postoperative rules and practices are modern, correct and thoughtful. The book covers general surgery, that of the eye, ear, nose and throat, orthopedics, urology, and the aptly phrased "medical operations." For the urban surgeon, the chapters on hypnotics and sedatives, infections of the hand, sprains, and general and Evipan anesthesia are of interest. There is even a section on tooth extraction. The last eight chapters, barring the excellent treatise on poisons, are apparently planned for the intern but merit perusal. Gynecological problems are discussed sparsely and poorly, as is usually the case except when the author is a full time gynecologist. The long section on laboratory procedures could well have been left to a laboratory manual.

The Health Insurance Doctor His role in Great Britain, Denmark and France Barbara N Armstrong 264 pp Princeton The Princeton University Press, 1939 \$3.00

The authoress is an enthusiastic believer in health insurance and gives "basic information about the situation of the health insurance doctor abroad." With a background of twenty years of research and university teaching in the social-insurance field, she made a personal investigation in 1936 in Great Britain, Denmark and France and gathered facts with the aid and co-operation of both governmental agencies and the medical profession.

Detailed information shows who are insured, how necessary funds are obtained, how doctors are chosen, their duties, how they are paid and what their attitude is toward the plan as a whole.

The British system went into operation in 1912, the Danish in 1892, the French in 1930. In Britain the worker only is insured, in Denmark the worker and his children (the wife is expected to be insured in her own right), in France all members of the family are covered. Insured groups were built up from existing fraternal organizations, with additions and modifications as required to meet new conditions. Insurance funds are made up of contributions by workers, by employers and by the government.

In Britain in 1936 about three fourths of the men and two fifths of the women in general practice were panel doctors. In the Copenhagen area of Denmark over 70 per cent of general practitioners are included, and outside this area nearly all physicians do some insurance work. Everywhere there is freedom of choice of doctors and ample provision for changing from one doctor to another. Hence the insurance doctor, like every other physician, to be successful must have the ability to attract and retain patients.

In Britain and Denmark the doctor is paid quarterly—in Britain from a government pool and in Denmark from the exchequer of health-insurance societies. In Britain payment is on a capitation basis, that is, the number of patients on his medical list at the beginning of the quarter, with additions for certain specified services. In Denmark the capitation basis prevails generally and the tendency is toward making it universal. In France the doctor charges his patients what he chooses and collects what he can. The patient is reimbursed, in part, by his society.

The health-insurance doctor is on a general practitioner basis, with provisions for hospitalization and reference to various specialists in appropriate instances. The fundamental principle is that the traditional, free, doctor-patient relation is desirable, and when economic conditions deny it to workers and their families, health insurance should restore it to them and to the doctors who would like to serve them. "In each country collective action by the organized medical profession plays a vital part in determination of the health insurance doctor's privileges, responsibilities and remuneration."

The doctors believe that health insurance gives a greater professional freedom in practice among the mass of the people, such as is enjoyed in private practice only in treating the well-to-do, also that it gives them a larger and steadier income. "Doctors appreciate security of income as much as anyone!" The regulated aspects, "the price they pay for its advantages, is an inevitable and not very onerous *quid pro quo*." In Britain there is evident a marked change in attitude—from bitter hostility when legislation was being discussed in 1909 and 1910, to enthusiastic approval after years of actual experience. Income

on the wage-earners group is two or three times as great. The pay check comes every quarter, in good times and in bad. Relations with patients are improved. The insured patient can see his doctor whenever he needs to without the barrier of a bill which he could not afford. The doctor can see chronic patients as often as he likes without embarrassment. One doctor gives each new patient a card which reads "If you get a cold come to see me. Let me decide whether it is important. I should like to treat a cold than pneumonia."

Once in Denmark, about twenty years ago because of controversy over the scale of payment, at the end of a year renewal contracts were made and doctors were on private-practitioner terms with insured patients who were entitled to reimbursement by their societies for from 50 to 75 per cent of medical bills which they had paid. This continued for one year but proved unsatisfactory in regard to the relations between doctor and patient and also reduced substantially the doctors' incomes. Since that time the doctors have been more enthusiastic than ever over the benefits of health insurance and more medical services have been included.

Physicians stress the fact that health insurance has greatly improved the practitioner's chance of preventing invalidity of his patients. This applies to loss of time from both acute and chronic disease and especially from tuberculosis.

This book should prove helpful to anyone interested in considering the complex questions of better distribution of medical services—who of us is not interested? Conditions in the United States differ greatly of course, from those in Britain, Denmark and France, but methods which have been tested, adjusted, readjusted, expanded and continued over periods of one to five decades surely are worthy of careful examination.

It is gratifying to note the authoress's recognition of the possibilities and effectiveness of organized medicine in the development and guidance of health insurance.

Winter of Allergy: A guidebook for those who must find their way through the mazes of this strange and tantalizing state. Warren T. Vaughan. 140 pp. St. Louis: The C. V. Mosby Co., 1939. \$1.50

A book, which is to mediate medical problems to the layman is admittedly difficult to write. The obvious dangers are those of either oversimplification leading to inhibition so far as the physician is concerned or of under-simplification leading to incomprehension on the part of the patient. Dr. Vaughan has steered himself a very skillful course. His analogies are so carefully qualified that no allergist could possibly be offended and yet are sufficiently clear to the patient who requires some understanding of the nature of his illness.

The author emphasizes the facts that the causes of allergic reactions are rarely immediate and, hence, that the allusions to the problems presented are not always obvious. This will help with patients who think that the insidious substance should invariably precipitate symptoms with dramatic suddenness. Also of value is the moral exhortation with which the book ends urging the patient to present himself for treatment early in his illness, and to expect full relief only after an adequate time, to be measured sometimes in years.

This little volume will not save the busy physician much of the time he now spends answering the questions of his allergic patients. He can be assured, however, that the questions asked will be much more intelligent, and

that the co-operation desired will be much firmer and long lasting.

Atlas of Surgical Operations. Elliott C. Cutler and Robert Zollinger. 181 pp. New York: The Macmillan Co., 1939. \$3.00

In the preface to this remarkable book the authors point out that while library shelves are filled with excellent systems and textbooks of surgery no manual of the technical steps of the accepted and standardized operations of the day has been offered for almost a hundred years. The volume was modeled after Bernard and Huettes *Précis iconographique de médecine opératoire et d'anatomie chirurgicale* which was published in 1853 and it resembles in many respects Pancoast's *Operative Surgery* published a few years earlier. The steps of some sixty-five common operative procedures ranging from tonsillectomy to abdominoperineal resection of the rectum are illustrated in severe, almost diagrammatic line drawings in eighty-four 10-by-15-inch plates. Opposite each plate is a brief description of the procedure as it is carried out at the Peter Bent Brigham Hospital with an outline of indications and preoperative and postoperative care.

In a few instances the artist, Miss Mildred Coddington has been obliged to sacrifice the illusion of depth for the sake of clarity but where this occurs it is a virtue rather than a fault and the third dimension is easily read into the drawing. Her style of clean-cut line drawing is perfectly suited to the subject matter and it is to be hoped that its successful employment in this book will mark the end of the fuzzy half tones so often seen in surgical literature.

Almost every surgeon of experience will disagree with certain of the procedures described. For example, one may favor a transverse rather than a vertical incision for simple mastectomy or be inclined to employ the closed Parker-Kerr type of intestinal anastomosis on the large bowel rather than the open method. But these are minor details and all will agree that the operations as outlined are safe and satisfactory procedures for the young surgeon, to whom the book is dedicated.

It is to be hoped that future editions will include descriptions of the common and standardized operations on fractures, such as suture of the olecranon and the patella. Also, presentation of certain more or less emergency procedures, such as the ligation of a bleeding middle meningeal artery or suprapubic cystostomy would be welcomed particularly by those who practice in rural regions.

This book will undoubtedly and deservedly become very popular. It should be in the library of every hospital in which young men are trained in surgery and there is no volume which could better serve as a *vade mecum* in technique for the practicing surgeon.

Cancer of the Colon and Rectum: Its diagnosis and treatment. Fred W. Rankin and A. Stephens Graham. 358 pp. Springfield, Illinois, and Baltimore: Charles C. Thomas, 1939. \$5.50.

In estimating the worth of a book one is rightly influenced by the reputation and previous experience of its author or authors. Few if any contemporary surgeons in this country have had greater opportunities to study and treat cancer of the large bowel than Rankin, who with the able assistance of Graham, records in this book the results of his extensive work at the Mayo Clinic and more recently in Lexington, Kentucky.

The volume is divided into three parts of five chap-

ters each, dealing with general considerations, treatment and operative procedures, respectively. The anatomy and physiology of the colon and rectum are ably discussed, with particular reference to the practical considerations hinging thereon. An adequate bibliography backs up the theories and figures relating to incidence, occurrence and etiology. The role of benign adenomas and multiple familial polyposis as precancerous lesions is rightly stressed.

One chapter devoted to differential diagnosis provides opportunity for a brief but complete statement of the proper methods of treatment of those other lesions of the colon and rectum with which cancer may be, and often is, confused.

In the second part, operability and prognosis, together with the many factors influencing their statistics, are discussed and supplemented by previously published tables of Rankin and his associates and of Gabriel and by those of the St. Marks Hospital, London.

In regard to choice of operation emphasis is paid properly on the point that any procedure, though it may vary in technical details, must be sufficiently thorough in scope of removal if it is to be considered a proper cancer operation.

Numerous tables having to do with mortality and end results are included from the writings of most of the best surgeons in this field, including those of the late Daniel F. Jones, whose experience with cancer of the large bowel was second to none.

The last 100 pages are devoted to detailed descriptions of all the operative procedures in common use and to line drawings which clearly illustrate these operations.

It is not an exaggeration to say that no other single book in the English language gives so complete and reliable an account of the diagnosis and treatment of cancer of the large intestine.

Radiologie Clinique du Coeur et des Gros Vaisseaux
C. Laubry, P. Cottenot, D. Routier, and R. Heim de Balsac. 2 vol., totaling 340 pp. Paris: Masson et Cie, 1939. 430 Fr. fr.

Following the fine tradition of the French school in cardiovascular roentgenology represented less than a generation ago by Bordet and Vaquez, Professor Laubry and his colleagues Cottenot, Routier and Heim de Balsac of the Faculty of Medicine of Paris and Hôpital Broussais-La Charité, have published, with the collaboration of Masson et Cie, two volumes of excellent x-ray pictures and diagrams illustrating normal and abnormal variations of size and shape of the heart and great vessels. As the authors write in the very first sentence of the introduction, this work represents the synthesis of their efforts of more than ten years. It is an account in large part of personal experience, thereby giving it greater value, but at the same time there is appended a useful bibliography of several hundred authors of all nationalities. The volumes form an instructive atlas for teaching purposes and immediate practical use; they are not intended as a routine textbook or complete treatise on the subject of cardiac roentgenology. All who peruse this work will at once appreciate its utility.

The first volume contains Part I, "General Observations," Part 2, "The Normal Heart," and the first chapter of Part 3, "The Pathologic Heart." The second volume contains the rest of Part 3, that is, the remaining six chapters on the pathologic heart.

Under general observations are presented the usefulness of x-ray examination of the heart and great vessels, the

methods of examination (radioscopy, orthodiagraphy, teloradiography, cineradiography, radiokymography, opacification of the heart and vessels, radiodensitometry, and tomography and seriescopy) and details of the techniques of radiography, radiokymography and cardiovascular angiography.

The second part on the normal heart presents morphology (factors which determine 'interindividual differences' and morphologic modifications in the same individuals), radiological anatomy in the frontal, right anterior oblique, left anterior oblique and left transverse positions, the value and interpretation of measurements, radiokymograms and particular features of certain cardiovascular silhouettes.

The third and last part is naturally the most extensive, presenting in Chapter I a wealth of illustrative material on rheumatic heart disease, with especial reference to the effect of the various valvular lesions, single and combined. Chapter II discusses congenital defects (interventricular septal defect, pulmonary stenosis, aortic stenosis, coarctation of the aorta, patency of the ductus arteriosus, interauricular septal defect, valvular deformities of the left heart, right aortic arch, situs inversus and "idiopathic" cardiac hypertrophy of the infant). Chapter III concerns the so-called "arterial cardiopathies" (aortitis, aortic aneurysms, "chronic diffuse myocarditis," partial aneurysms of the heart, pulmonary arterial aneurysms and non-aneurysmal dilatations, and arterial hypertension). Chapter IV presents pericardial abnormalities (effusions, adhesions and diverticula). Chapter V gives a few illustrations of cardiac hypertrophy, dilatation and failure, involving the left or right ventricle or both. Chapter VI devotes a few pages to intracardiac and mediastinal foreign bodies. Finally, Chapter VII presents thoracic pictures difficult to interpret—an interesting though limited collection of films. Following the bibliography already referred to there is an adequate alphabetical subject index.

The reviewer wishes there were more complete illustration of various conditions,—in particular the dilated heart of early rheumatic infection in childhood before valvular disease has developed, the cor pulmonale, the hypertensive heart and certain other rarer conditions,—but for the time being we must be content with the limited but excellent material presented. Perhaps in a later edition another volume could be added or the present ones made somewhat larger to fill these gaps, for it would be well worth while. This work, as it is, can be heartily recommended to students and physicians who are interested in x-ray pictures of the heart and great vessels, which should include all who practice internal medicine. The expense of the volumes may prevent their wide dissemination through the profession at large but they should at least be in all medical libraries which are consulted by students and practitioners. The fact that the text is in French should not be a drawback because of the wealth of illustrations and the ease with which the main headings of the legends can be translated.

The Hospital Care of Neurosurgical Patients Wallace B. Hamby. 118 pp. Springfield, Illinois, and Baltimore: Charles C. Thomas, 1940. \$2.00.

With the growth of neurological surgery in the last fifteen years, there has come new responsibility in caring for these patients from the point of view of nursing. Both preoperative and postoperative care offer problems which do not ordinarily arise in connection with patients undergoing general surgical treatment. Dr. Hamby has visualized these problems and has written a brief book which ought to be of distinct value to nurses and junior physicians.

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SUBPHRENIC ABSCESS*

A Report of One Hundred and Eleven Consecutive Operative Cases

HENRY H. FAXON, M.D.†

BOSTON

THE most satisfactory method of handling an inflammatory process beneath the diaphragm is still a matter of debate, and any clarification of the disputed issues must come as a result of study of a number of cases sufficiently large to be of significance. During the years from 1900 to 1938, inclusive, there have been 175 cases at the Massachusetts General Hospital in which a diagnosis of a subphrenic infectious process has been made (Table 1). In 22 cases, undrained abscesses,

and those with true subphrenic abscess for matation.

Six patients, on whom operation was performed but without encountering pus, were presumably suffering from a similar nonsuppurative type of lesion. Thus, in 38 or 22 per cent of the cases there was an inflammatory process beneath the diaphragm for which no surgical intervention was indicated. Undoubtedly there were an indeterminate number of cases falling into this same category that were never recorded as subdiaphragmatic inflammation because of the surgeon's unwillingness to make a diagnosis which could not be confirmed. Lee² points out in reporting a selected number of these same cases that the occurrence of subphrenic inflammation subsiding without operation is not a rare finding. Ochsner and Graves³ state that over two thirds of all subphrenic infections subside without suppuration, and I suspect that their estimate more nearly approaches the true incidence of this condition than does the 22 per cent given above in connection with the present series.

ANATOMY

Martinet⁴ in France and Barnard⁵ in England, at the beginning of this century first accurately described the subphrenic spaces, and since that time it has generally come to be accepted that the term "subphrenic" as used to designate the localization of an abscess refers not alone to the region immediately below the diaphragm, but includes as well an area that extends as far down as the transverse colon. If this more comprehensive space be considered it will be seen that it is subdivided by the ligaments of the liver and the adjacent structures. To the right of the falciform suspensory ligament, and bounded by the liver edge below, lie the right anterior and right postero-

TABLE 1 Cases Diagnosed as Subphrenic Abscess or Subphrenic Inflammation

| CLASSIFICATION OF CASE | NO. OF CASES |
|--|--------------|
| Operation for subphrenic drainage | 111 |
| No operation ("subphrenic inflammation") | 32 |
| No operation for subdiaphragmatic abscess (confirmed at autopsy) | 22 |
| Operation but no pus encountered | 6 |
| Spontaneously drained via previous operative sinus | 4 |
| Total | 175 |

usually of secondary importance to other equally lethal diseases, were discovered at autopsy. A study of the clinical course in these cases, however, gives added weight to the findings of Ochsner and DeBakey¹ in a large series of cases assembled from the literature. These demonstrated that collections of pus beneath the diaphragm will terminate in a fatal outcome in approximately 90 per cent of cases unless they are surgically drained.

Spontaneous drainage was encountered in 4 cases of this series, in all of which the apparently bealed sinus, formed about the wick of a previous laparotomy, served as a guide for the escape of pus imprisoned beneath the diaphragm.

In 32 cases the clinical course, physical findings and x-ray evidence suggested a mild irritative process beneath the diaphragm. All these patients recovered without surgical interference, and a diag-

*Read at the annual meeting of the New England Surgical Society, Salem, Massachusetts, September 29, 1939.

†Assistant in Surgery, Harvard Medical School; senior surgeon, Massachusetts General Hospital, Boston.

superior spaces, separated by the cardinal ligament of the liver and its lateral extension (Figs 1 and 2). The anterior space is by far the larger of the two because of the decidedly posterior position of this ligament. Between the leaves of the ligament and abutting on the peritoneal cavity, but not actually within it, is a distinct and separate area which is extraperitoneal, and may represent the confines

again three spaces, but because of the extreme posterior position of the left lateral ligament there is but a single superior space. The left postero-inferior space is the lesser peritoneal cavity, while the left anterior space is bounded by the liver above, the stomach below and the gastrohepatic omentum posteriorly.

It is a lack of familiarity with these constant anatomic spaces that often leads to an unwise selection of approach for drainage, and to an unfortunate hesitancy in the actual execution of the operation. That a certain amount of ambiguity exists in the minds of some surgeons regarding these spaces is not surprising, because of the relative infrequency with which any one surgeon is called on to differentiate them. In this series, the greatest number of cases drained by any individual was only 10, and fifty-two different operators were responsible for the surgical treatment of the 111 cases reported.

AGE INCIDENCE AND SEX DISTRIBUTION

The age incidence in the 111 operative cases of subphrenic abscess showed a steady increase from the first to the fifth decade, the average age for the group as a whole being thirty-eight years (Table 2). The youngest patient was three years

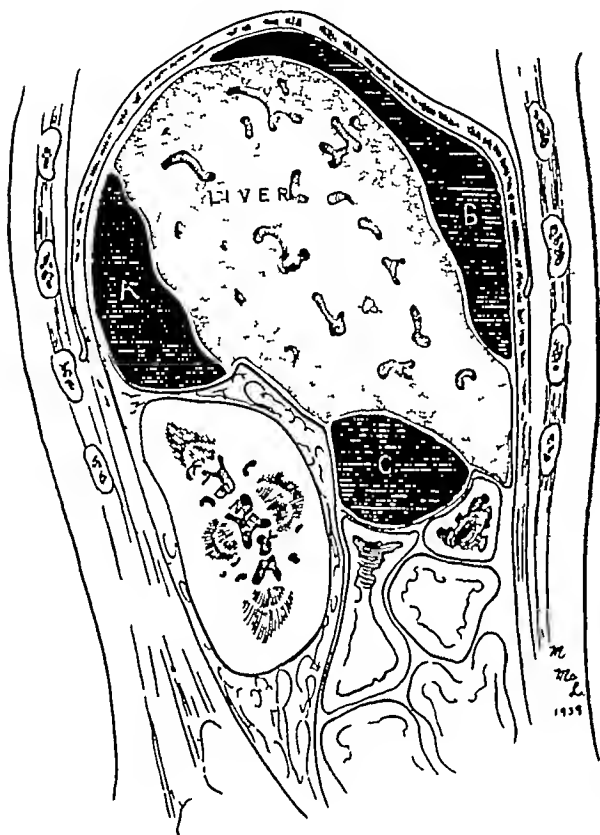


FIGURE 1 *Sagittal View of the Right Abdomen*

This shows the relative sites of abscesses occurring in the three most commonly involved subphrenic spaces. A—right posterosuperior, B—right anterosuperior, C—right inferior.

of a subphrenic abscess or the extension of a process from one of the adjacent spaces. The right inferior space is bounded by the kidney posteriorly, the undersurface of the liver above, the round ligament and the ligament of the ductus venosus medially, and the transverse colon below. In addition to these divisions on the right, a potential retroperitoneal space exists between the diaphragm and the diaphragmatic peritoneum that may become distended with pus from a dissecting retroperitoneal infection. In this series the latter space played a relatively minor role.

The left subphrenic area is far less commonly involved than is the right, there being only 13 per cent of this series in which an abscess was found to the left of the midline. On this side there are

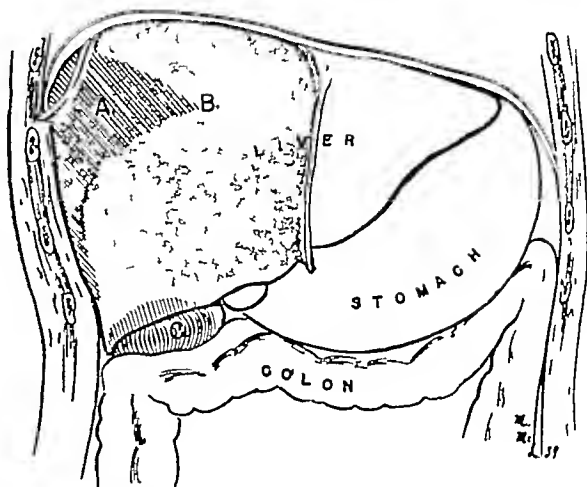


FIGURE 2 *Anterior View of the Abdomen*

This shows the relative sites of abscesses occurring in the three most commonly involved subphrenic spaces. A—right posterosuperior, B—right anterosuperior, C—right inferior. The shaded portions of A and C are actually not visible in this view as they lie behind the substance of the liver.

old and the oldest was seventy-six. As regards the distribution of the sexes, 68 of the patients (61 per cent) were men.

ETIOLOGY

Although certain subphrenic infections undoubtedly gain access to the subdiaphragmatic area by way of the lymphatics and the blood stream, the

vast majority originate from an extension of in traperitoneal sepsis. Such extension up the lateral gutter is favored by the presence in the upper abdomen of a negative pressure fluctuating with respiration, as demonstrated by Overholt.⁶ In addition to this factor, the ventral curvature of the lumbar spine with the patient in the supine position

TABLE 2. Incidence according to Decades

| Age | No. of Cases | Per Cent of Total Cases |
|-------------|--------------|-------------------------|
| 31 | 6 | 5 |
| 10-20 | 12 | 11 |
| 20-30 | 15 | 13 |
| 30-40 | 25 | 23 |
| 40-50 | 23 | 21 |
| 50-60 | 23 | 21 |
| 60 and over | 7 | 6 |
| Total | 111 | |

tion results in a transverse ridge that favors the gravitation of pus distally into the pelvis and proximally into the subdiaphragmatic region.

Infection originating in the appendix, as shown in Figure 3, is the commonest source of subphrenic

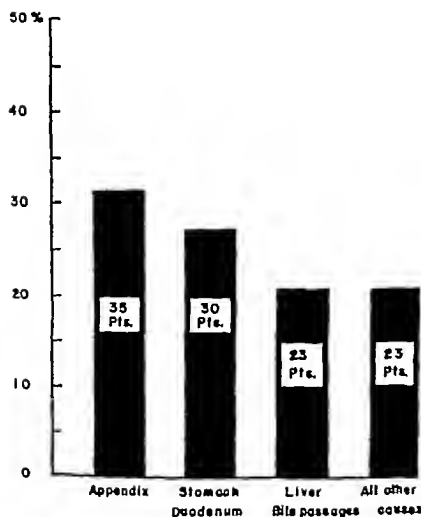


FIGURE 3. Etiology of Subphrenic Abscess

abscess formation, and was responsible for 31 per cent of the cases in this series.

Second in importance as the primary source of infection were lesions in the stomach and duodenum, responsible for 27 per cent of the abscesses, while those in the liver and bile passages, with 21 per cent, ranked third. All other sources com-

bined (21 per cent) individually played very minor roles as etiologic factors. In the collected series of cases reported by Ochsner and DeBakey,¹ and already referred to, the order of importance in the inciting causes was found to be the same.

DIAGNOSIS

The presence of a subphrenic abscess should be suspected in any patient with a persistent unexplained fever associated with a history of recent intraperitoneal sepsis. It should be borne in mind that not infrequently (in 26 per cent of these cases) the inciting cause is never clearly established, although in most cases in this series (64 per cent) an antecedent laparotomy had either confirmed the presence of a septic focus, or had itself proved to be a source of untoward peritoneal contamination. Ten per cent of the patients had had no operation preceding the drainage of their abscesses, but because of the accurate histories there was little doubt as to the original source of infection.

In its early stages it is not always easy to diagnose the condition. Not only may there be some doubt as to whether the infection about the diaphragm is above or below that structure, but the decisions as to whether the infection will subside

TABLE 3. X Ray Data in 83 Cases* of Subphrenic Abscess

| X Ray Data | No. of Cases | Percentage of Total Cases |
|--|--------------|---------------------------|
| Diaphragm elevated | 65 | 78 |
| Diaphragm not elevated | 3 | 4 |
| Diaphragm not visualized | 15 | 18 |
| Fluid level and gas below diaphragm | 221 | 26 |
| Opaque injection into pre-existing sinus | 5 | 6 |

*In 28 cases no preoperative x-ray films were taken. None of these cases showed no fluid level, although gas could be demonstrated.

without suppuration and as to which of the spaces it involves are both of prime practical importance. Granted the case in which it is reasonable to suspect the presence of a subphrenic abscess, the diagnosis is made on one or more of the following points: the presence of tenderness over the twelfth rib or lower costal margin to firm palpation or compression, the clinical findings of a high, fixed diaphragm on the affected side, together with such manifestations of diaphragmatic irritation as pain referred to the shoulder or neck, hiccoughs and discomfort on deep respiration, and the confirmation by roentgenological studies of the clinical impression as to the position and excursion of the diaphragm.

Table 3 gives the x-ray findings in the 83 cases so studied, and substantiates the statement of LeWald⁷ that, regardless of the space involved, the

diaphragm if it can be visualized by x-ray will almost invariably be found to be elevated and usually fixed. The presence of gas and a fluid level occurred in 26 per cent of our cases, either as a late finding, or because of the introduction of gas into the involved area from a perforated viscus or an externally draining sinus. It should be remembered that following laparotomy alone, free air beneath the diaphragm may be demonstrated frequently by x-ray for as long as two weeks after operation, as brought out by Muller, Overholt and Pendergrass.⁸ Those cases in this series in which no x-ray films were taken were largely the ones dating back to the earlier period when such studies were not readily available. In 5 of the cases, the

to attempt to secure a satisfactory lateral plate or to carry out fluoroscopic studies, but whenever the patient's condition will permit these procedures, the evidence so secured will be of inestimable help in establishing which of the subdivisions is involved.

The presence of serous effusion above the diaphragm is another suggestive sign of the existence of a subphrenic abscess, although opinions differ as to the constancy of this finding. Thus, Clute⁹ and Beyer¹⁰ believe that it is almost invariably present, whereas Ochsner¹³ contends that it is usually a late finding in neglected cases. In attempting to arrive at a conclusion on this point from the findings in this series (Table 4), it seemed unwise



FIGURE 4 Lateral X-Ray Film of an Abscess Cavity

This lies in the right posterosuperior space and has been injected with Lipiodol through a persistent sinus following cholecystectomy with drainage. There is some distortion due to the angle at which the exposure was made. The involved area has been retouched for greater clarity in the reproduction. The patient promptly recovered following drainage by the retroperitoneal type of approach.

injection of a radio-opaque substance into a sinus tract, persisting from previous operative drainage, served as a simple method of demonstrating the location of a residual subphrenic abscess (Fig 4).

It is obvious from a review of the more recent records that in many cases the surgeon did not fully avail himself of the help that x-ray studies might have afforded, but was satisfied with a simple anteroposterior view and a statement that the diaphragm was elevated and fixed. There are, of course, patients so ill that it may seem unwise

TABLE 4 Findings as Regards Pleural Effusion Associated with Subphrenic Abscess

| CLINICAL DATA | NO OF CASES | PERCENTAGE OF TOTAL CASES |
|--|-------------|---------------------------|
| No chest tap or operative comment on visualization of pleural cavity | 73 | 66 |
| Empyema at time of subphrenic drainage | 9* | 8 |
| No fluid by chest tap (4) or by visualization (5) | 9 | 8 |
| Pleural effusion by chest tap (20) or visualization (0) | 20† | 18 |
| Total | 111 | |

*78 per cent of these were grossly neglected cases occurring prior to 1924.

†85 per cent of these involved one of the superior spaces.

to hazard a definite statement as to the presence or absence of chest fluid in the 73 cases in which neither a chest tap nor direct visualization of the pleural cavity had been carried out. In 9 neglected cases, all but 2 of which occurred prior to 1924, a definite diagnosis of empyema had been established at the time of the subphrenic drainage. Thus, there remained 29 patients with subphrenic abscesses confirmed by operation whose pleural cavities were either explored by thoracentesis (24 cases) or by visualization at the first stage of the transpleural technic of subdiaphragmatic drainage (5 cases). Judged by such criteria, 8 per cent of the total number of cases showed no fluid, whereas 18 per cent showed it to be present in varying amounts.

It might be assumed that the longer the subphrenic abscess has been present without adequate drainage, the greater would be the incidence of pleural effusion. I fully realize that it is impossible to draw any final conclusions from these figures, but the fact that the average elapsed time between the onset of the original septic process and the exploration of the pleural cavity was thirty days in the cases in which no fluid was demonstrated, and twenty-six days in the ones in which an effusion was found, suggests that the duration of the subphrenic abscess is not the sole factor in

determining the incidence of pleural involvement

The fact that 85 per cent of those cases in which the presence of fluid above the diaphragm was established had a subphrenic process involving one of the superior spaces, bears out the assumption that the abscess must almost always be in direct contact with the diaphragm in order to give pleural effusion above it

Downward displacement of the liver is often

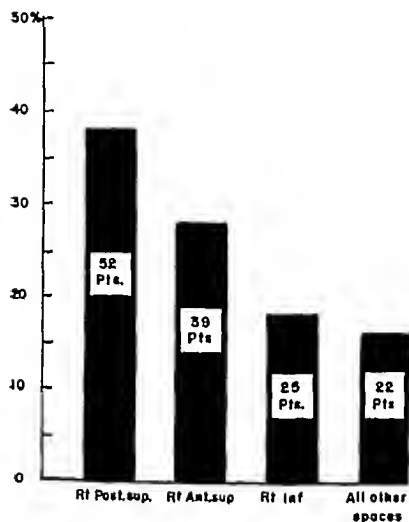


FIGURE 5 Localization of Subphrenic Abscess

A total of 138 spaces were involved in the 111 cases. The "all other spaces" included left superior 8 per cent, left antero-inferior 5 per cent and retroperitoneal 3 per cent.

difficult to determine, but if this finding can be established it is an added factor suggestive of an abscess in one of the superior spaces

the time of the antecedent laparotomy and the institution of drainage for the subphrenic abscess, when both of these were carried out at the same hospital entry. It might well be expected, and is certainly to be hoped, that in future, with more intelligent interpretation of the x-ray data and less reticence in accepting suggestive findings as an indication for surgery, operation will be instituted earlier. I am sure that an occasional negative exploration early in the period when a subphrenic abscess is suspected is far more desirable than procrastination carried to a degree that renders the presence and location of the abscess self-evident.

LOCALIZATION OF ABSCESS

In 87 per cent of the cases the abscesses were on the right side (Fig 5), with the right postero-superior space most frequently involved (38 per cent), and the right anterior (28 per cent) and the right inferior (18 per cent) spaces of lesser importance, 3 per cent of the abscesses on the right side were in the retroperitoneal areas. The necessity of determining before operation which space or combination of spaces is involved cannot be overemphasized, this determination can best be made by an observance of the following factors:

The location of the point of maximum tenderness. It is at times difficult to elicit convincing evidence from pressure over the twelfth rib posteriorly or the lower costal margin anteriorly in the early stages of development of an abscess. However, repeated examinations will eventually show tenderness to be present over an involved space in practically every case. Not infrequently deep pressure or compression of the lower chest wall will elicit this sign when it cannot be demonstrated by lighter forms of palpation.

The x-ray findings especially those shown by fluoroscopy and lateral films, and those taken after

TABLE 5 Influence of Etiology on Spaces Involved in Subphrenic Abscess*

| ETIOLOGIC FACTOR | No. of Cases | CASES WITH MORE THAN ONE SPACE INVOLVED | | SPACES INVOLVED | | LEFT AND RETROPERITONEAL | |
|-------------------------|--------------|---|----------|------------------------|-----------------------|--------------------------|--------------------------|
| | | 1 OR 12 | 12 OR 12 | RIGHT POSTERO-SUPERIOR | RIGHT ANTERO-SUPERIOR | RIGHT INFERIOR | LEFT AND RETROPERITONEAL |
| | | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| Appendix | 35 | 10 | 4 48 | 9 | 18 | 10 | 7 14 |
| Gastric and duodenum | 30 | 5 | 9 29 | 12 | 39 | 5 | 5 16 |
| Liver and bile passages | 23 | 4 | 7 25 | 13 | 46 | 5 | 3 11 |
| All other causes | 23 | 5 | 12 41 | 5 | 17 | 5 | 7 25 |

* A total of 138 spaces were involved in the 111 cases.

It is disappointing to note that, as time has gone on, there has been no appreciable decrease in the average interval of twenty six days between

the injection of a radio-opaque substance into a pre-existing inadequately draining sinus tract.

A consideration of the original septic process

with special reference to the most likely site of its extension beneath the diaphragm (Table 5) Thus, in the 35 cases in which an acute appendix was the causative factor, 68 per cent of the associated subphrenic abscesses were found in either the right posterosuperior or right inferior space. It is of interest to note that nearly half the abscesses following surgery on the gall bladder occurred not in the dependent right inferior space, which presumably was adequately drained at the time of operation, but in the contaminated but undrained right anterosuperior space. When the stomach or duodenum, either from perforation or previous surgery, was the source of the original infection, the right anterosuperior space was involved in 39 per cent of the subsequent subphrenic abscesses, and the right posterosuperior space in 29 per cent. More than one of the spaces was involved in 24 cases, the commonest combination of the right posterosuperior and right inferior spaces being found in 13 per cent of the series.

The *aspiration of pus from a suspected area* beneath the diaphragm. This adjunct to localization is mentioned here because of the frequency with which it is employed rather than because of any inherent merit in the procedure. Personally, I agree with Whipple,¹¹ Schwartz¹² and numerous others that it is a pernicious practice that should be condemned, because of the risk attendant on the removing of a contaminated needle through an uninvolved serous cavity. Although a productive tap is indisputable evidence of the presence of pus, failure to locate pus with a needle cannot be taken as evidence that no abscess exists, and the contention that because of the septic process beneath the diaphragm the lower portion of the pleural cavity will have become shut off by adhesions, making thoracentesis a perfectly safe procedure, cannot be relied on. The only time when I believe aspiration is justified is at operation after the preliminary steps have been taken so that the surgeon by direct visualization can satisfy himself that there is no possibility of contaminating an uninvolved area. Even under such circumstances an incision to permit a more generous exploration beneath the diaphragm would usually seem more desirable than the blind searching of the region with a needle. Attempts to locate the abscess by aspiration before operation are recorded in 13 cases, while an exploratory needle was used at the time of operation in 28.

Thoracentesis of the pleural cavity to determine the presence and nature of fluid in this space may be carried out to advantage in certain cases of suspected subphrenic abscesses in order to differentiate an empyema and a sterile collection of transudate above the diaphragm. However in such exploratory preoperative aspirations care should be

taken that the tip of the needle does not pass beyond the confines of the pleural cavity.

TREATMENT

Granted the diagnosis of a collection of pus beneath the diaphragm, there is complete unanimity of opinion that the treatment lies in prompt drainage of the area. It is not within the province of this paper to give a detailed description of the various technics that may be employed, for any surgeon interested in the subject is already familiar with the transthoracic methods and the retroperitoneal types of approach. The moot question, however, of the choice between these two broad classifications of drainage is most pertinent. All surgeons would be in accord in favoring that procedure which will most promptly and effectively drain the abscess with the smallest risk to the patient. The final decision should be based on a consideration of fundamental surgical principles and a study of the reports contrasting the two methods of approach.

The advocates of the transthoracic approach argue that it is superior because it affords more direct access to the involved area. I believe, however, that they discount too readily the increased risk of contamination of the pleural cavity inherent in this type of drainage. The contention that such contamination will rarely occur seems to be controverted by the fact that soiling of the pleural cavity took place in 32 per cent of the cases so drained, the percentage being slightly higher if only the cases done in two stages be considered. The delay that a two-stage procedure necessitates is a further but less important consideration that is often overlooked.

It should be pointed out that in only 13 of the 42 cases drained by the transthoracic approach was the procedure done in two stages, for most of the earlier cases were done at a single operation. At the present time, few surgeons would defend the one-stage procedure save in exceptional cases, for it cannot be assumed that the pleural cavity at the costophrenic angle will have become obliterated because of the infectious process below the diaphragm. It is apparent from a study of the relatively small segregated group of cases done in two stages that the results are distinctly more favorable than would appear from the figures of this transpleural group as a whole.

The advocates of the retroperitoneal type of approach, so well described and illustrated by Ochsner and Graves,³ contend that this method at a single operative step gives the abscess adequate dependent drainage with the smallest chance of contaminating uninvolved surfaces. In only 4 per cent of our cases in which this method was employed was either the pleural or peritoneal cavity

inadvertently opened and contaminated. The average postoperative stay in the surviving cases since 1917, when our convalescent home was abandoned, was forty-three days for the cases drained retroperitoneally, and fifty-eight days for those drained by the thoracic approach. Such a protracted convalescence, regardless of the type of operation employed, should not be necessary with prompt diagnosis and earlier institution of drainage.

In the cases in which the right posterosuperior or right inferior space was involved, the operative technic consisted of resection of the entire twelfth rib and division of the underlying fibers of the diaphragm and fascia in order to permit access to

ately placed below the costal margin of the area in which tenderness could be elicited. Thus, in the right anterior space it was made obliquely below the ribs anteriorly and extended down to, but not through, the peritoneum. By blunt dissection, chiefly with the finger, the peritoneum was then separated from the overlying layers until the abscess cavity was reached and could be broken into without contamination of the general peritoneal cavity. The retroperitoneal type of drainage was employed in 49 cases.

There is no justifiable defense for the transperitoneal approach in the drainage of the superior subphrenic spaces, as it has no valid advantage over the other methods, and implies contamination of the peritoneal cavity. It is true that with the less commonly involved left inferior space this type of approach must necessarily be used. However, the formation of adhesions between the anterior abdominal wall and the underlying abscess in this group of cases usually renders the operation under these circumstances extraperitoneal, in the sense that there is no further contamination of the general peritoneal cavity. In the great bulk of the 20 cases done by the transperitoneal approach, this was carried out in the early years of the series, before the advantages of the retroperitoneal type of operation were fully appreciated.

MORTALITY RATE

It is hard to arrive at a fair criterion for determining the mortality rate attributable to subphrenic abscesses, because of the difficulty in evaluating the importance of the original focus of infection as a factor in a fatal outcome. Certainly many of these cases, even if they had never developed a subdiaphragmatic process, had ample cause for death, but to attempt to segregate the cases in which the fatality was due to the primary lesion from those in which the subphrenic abscess could be held responsible would introduce so large a variable human factor as to make the figures meaningless. For this reason, all the deaths in this series are included in computing the mortality rate of 37 per cent for the 111 cases as a whole.

Complications attributable to the fact that the subphrenic process arose prior to drainage or as a result of it contributed toward increasing the number of deaths. Delay in diagnosis was responsible in practically every case for the more serious complications present before operation. The occurrence, relatively early in the series, of 6 cases of rupture of the diaphragm, 3 of these resulting in bronchopleural fistulas, and of an additional 3 cases of pre-existing empyema brings out the dangers of procrastination.

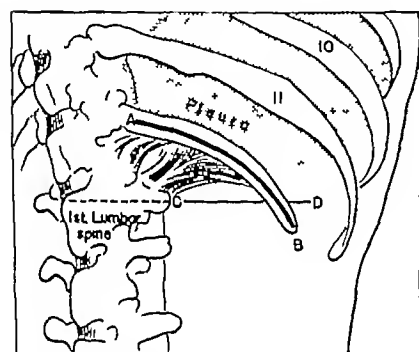


FIGURE 6. Diagrammatic Sketch

This shows the proper line of division of the fascia (C-D) at the level of the first lumbar vertebra. Such an incision invariably avoids contamination of the pleural cavity which would occur in certain cases if the dissection were carried down beneath the line of the skin incision (A-B) and through the bed of the twelfth rib.

the retroperitoneal space. From this point, the abscess cavity could be reached by blunt dissection of the peritoneum and entered directly. In dividing the fascia, care should be taken to make the incision horizontally at a level of the first lumbar spinous process rather than obliquely along the bed of the twelfth rib (Fig 6), as failure to observe this precaution will result in a disastrous contamination of the pleural cavity in a certain number of cases. This has been shown to be possible by Melnikoff¹³ in a study of cadavers in which he demonstrated that the pleura on the right extends to below the twelfth rib in 62 per cent of all cases, but is never found as low as the level of the first lumbar spinous process.

In the retroperitoneal approach to the other subdiaphragmatic spaces, the incision was appropri-

That contamination of the pleural or peritoneal cavity at the time of operation will result in rais-

TABLE 6 *Effect of Contamination at Time of Operation on the Mortality Rate*

| LOCATION OF CONTAMINATION | No OF CASES | MORTALITY % |
|---|-------------|-------------|
| Both pleural and peritoneal cavities contaminated | 1 | 100 |
| Pleural cavity contaminated | 16 | 69 |
| Peritoneal cavity contaminated | 17 | 53 |
| Neither cavity contaminated | 77 | 23 |
| Total | 111 | |
| Grand average | | 37 |

ing the mortality rate should be self-evident, and Table 6 bears out most strikingly the truth of this statement, for it will be seen that with soiling

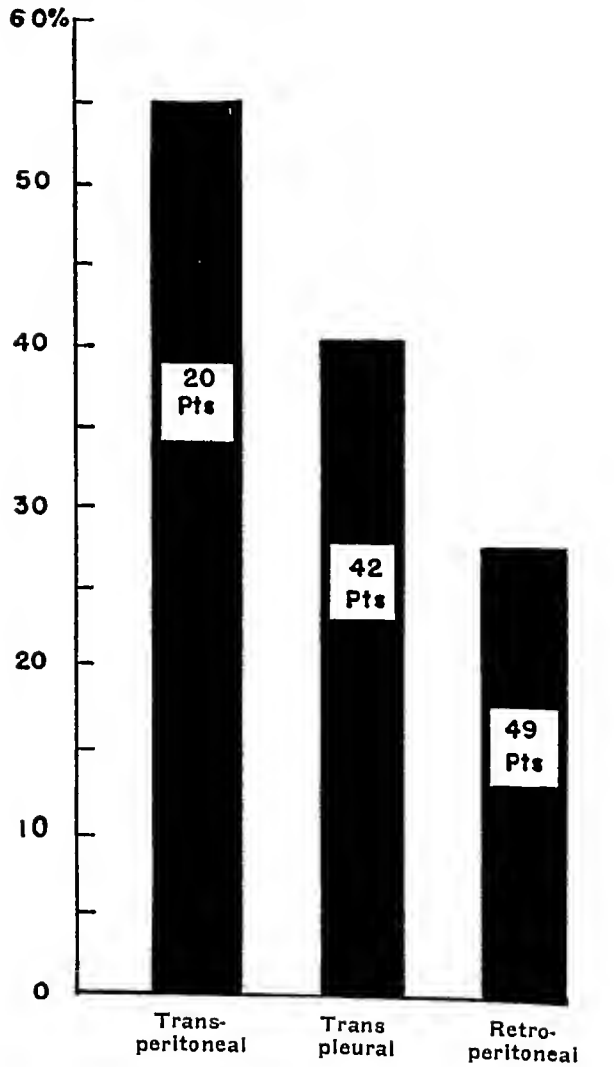


FIGURE 7 *Mortality Rate According to the Type of Operation*

of either of these cavities there is well over a two-fold increase in the mortality figure. That there is a wide variation in the risk of such contamination with the different types of operation has already been referred to, and I believe that it is

this factor which accounts for a difference in the mortality figures (Fig 7) of 55 per cent for the transperitoneal approach, 41 per cent for the transpleural type of drainage and 27 per cent for the retroperitoneal operation. In the series of collected and personal cases reported by Ochsner,¹ the same relation existed and was even more striking, for

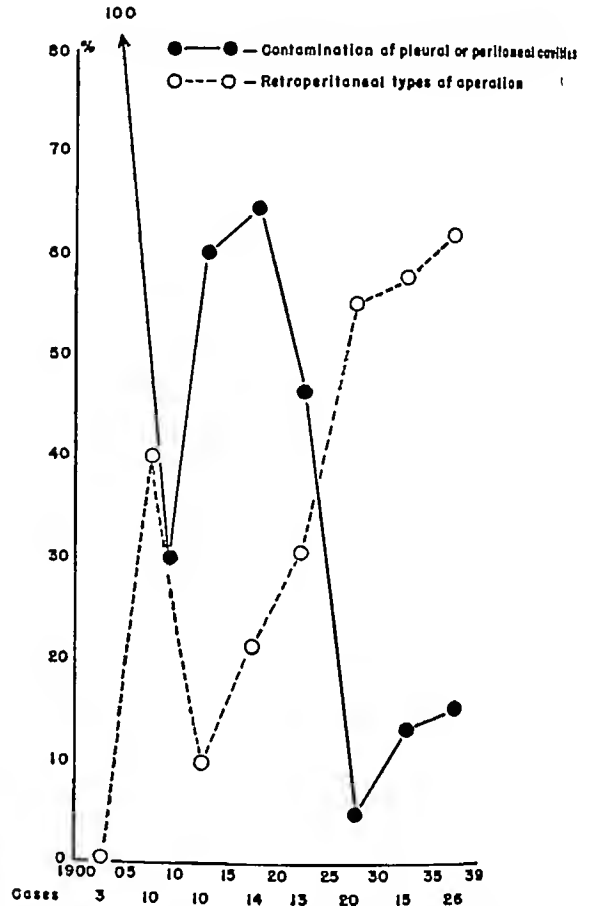


FIGURE 8 *The Percentage Contamination of the Pleural or Peritoneal Cavity and the Incidence of the Retroperitoneal Types of Operation, According to Five Year Periods*

in those cases the mortality rate in the patients drained by the retroperitoneal method was only slightly more than half that found with either the transpleural or the transperitoneal approach.

A growing conviction that the extraperitoneal approach is the safest type of operation accounts for our increasing use of this procedure (Fig 8), and from a study of the cases it appears valid to conclude that the consequent proportionate decrease in the number of cases of contamination of the pleural and peritoneal cavities was due almost wholly to the wider adoption of the retroperitoneal operation. If Figure 8 be studied in conjunction with Figure 9, it will be seen that almost without exception the mortality rate has varied proportionately with the incidence in the use of the retroperitoneal type of operation.

It might seem from the above and from the published reports of others¹⁻³ that there would no longer be any sustained effort to defend the transpleural method of approach, yet in numerous recent cases I have found ardent champions of this apparently less desirable type of operation

SUMMARY AND CONCLUSIONS

The statistical data relative to the 111 consecutive, drained cases of subphrenic abscess occurring at the Massachusetts General Hospital from 1900

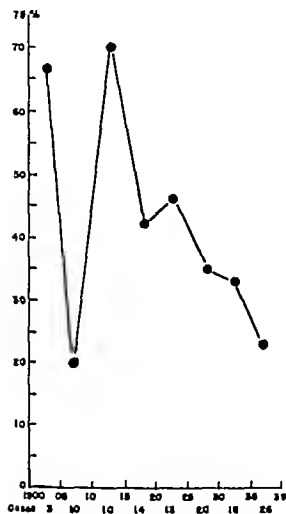


FIGURE 9 The Mortality Rates According to Five Year Periods

to 1939 are presented. The importance of early and accurately localized diagnosis of the involved area is stressed. The advantages of the retroperitoneal over other surgical types of drainage are emphasized.

From these data it can be concluded

At least one fifth of all infections in the subphrenic region subside without abscess formation.

The proper treatment of a subphrenic abscess is prompt surgical drainage.

A diagnosis of an abscess beneath the diaphragm that does not differentiate between which of the clearly demarcated subphrenic spaces is involved leads to hesitancy in the method and time of operation.

The right side is involved nearly seven times

as frequently as the left, with the right posterior and anterosuperior spaces the site of the abscess in two thirds of all cases.

Contamination of the pleural or peritoneal cavities at the time of operation more than doubles the mortality rate.

Contamination of the pleural or peritoneal cavities occurs far more frequently with the transthoracic and transperitoneal types of approach than it does with the retroperitoneal operation.

Both the theoretical and the statistical evidence favor the retroperitoneal type of operation as the procedure of choice in the drainage of a subphrenic abscess.

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DISCUSSION

DR. HOWARD M. CLUTE, Boston: In the consideration of subphrenic abscess, the first requirement, as Dr Faxon has clearly pointed out, is the early recognition of the condition. He has shown very clearly that the patients who had had the disease for a long time were poor risks and had a poor chance of recovery.

In our hospital when a postoperative case develops a fever we expect that in the majority of cases, if we are careful enough and hunt hard enough, we shall find that the cause is in the abdominal wound. If we do not find it there we expect to find it in the pouch of Douglas, and if we fail to find it there, we take x-ray films of the chest in order to see whether or not a subphrenic abscess is present.

I think it is most important to point out that there are no pathognomonic symptoms—merely fever of unexplained origin coming on after operation or peritoneal trauma. That there is a possible etiology for subphrenic abscess in such a case should make us hunt actively for an abscess. If we do that we shall find it much more often, I believe, than any of us suspect.

Dr Faxon pointed out that some 25 per cent of his

cases had evidence of definite subphrenic infection, which, however, did not go on to abscess formation. This shows how carefully he and his confreres follow these cases and points to the need for some delay before operating on early cases.

When I first became interested in subphrenic abscesses, the one stage retroperitoneal approach, which Ochsner describes and Dr. Faxon and his associates advise, was not in common use and we were not familiar with it. We started with the two-stage transpleural method. I still use it, but I feel a little less in favor of it at the present time in view of Dr. Faxon's figures, and because of the obvious good sense of the one stage retroperitoneal approach. We have, however, had very satisfactory results with the two-stage approach.

If you look at the ordinary picture that shows the relation of the parietal and diaphragmatic pleura, they appear to be widely separated. In cases of subphrenic abscess, however, the diaphragm is raised very markedly and the costophrenic angle is reduced or obliterated, and my experience has been that the diaphragmatic pleura and the parietal pleura are usually in close approximation.

Dr. Faxon has emphasized, and I agree, that the great danger in draining a subphrenic abscess is that you will give the patient additional trouble by soiling the pleural cavity and causing empyema. With this in mind, I have found it a good plan to remove 11 cm. or more of the tenth rib in the midaxillary or postaxillary line, suture the diaphragm to the parietal pleura and pack the wound. After twenty-four or forty-eight hours the pleural cavity is walled off. At the second operation there is afforded a large exposure, and one may enter the subphrenic area with freedom and ease and explore it. There should never be postoperative empyema.

I have tried to approach these abscesses on the side by taking out a piece of the tenth or eleventh rib and pushing up the pleura, being careful not to perforate it. I think that this is a highly dangerous procedure, since it is very easy to make a small opening in the pleura. I have noted in Ochsner's article—and I believe Dr. Faxon also says so—that even in the retroperitoneal approach the pleura runs to the level of the twelfth rib and sometimes a little beyond, a place where it is apt to be injured. I am inclined to think that the transpleural approach has advantages, chiefly because the surgeon recognizes that the pleural cavity is in danger and takes care to wall it off, and because there is a large exposure for the second stage, thus facilitating exploration of the subphrenic area and drainage of the abscess.

DR. THACHER W. WORTHEN, Hartford, Connecticut. This is a timely subject, and I agree with Dr. Faxon's conclusions. Analyzing the figures in his series, one arrives at the fact that the yearly average incidence was between 4 and 5 cases. If one eliminates the cases with the diagnosis of subdiaphragmatic inflammation which were not confirmed either by operation or by autopsy, the incidence was only about 3. A series of cases at the Hartford Hospital, covering a ten year period, had nearly the same incidence. The mortality in this group was a little over 20 per cent.

The real problem that the review of these cases revealed was the difficulty of finding the abscess at operation. Three cases were diagnosed at autopsy as subdiaphragmatic abscess, but no pus had been found at operation. In 2 of these cases an anterior and a posterior approach had been made, yet a large collection of pus in the posterosuperior space had not been found.

The surgical treatment of subdiaphragmatic abscess

may be approached from two points of view, the conservative and the radical. A certain degree of conservatism is warranted in some cases in the early stages of the formation of the abscess, because there are cases of so-called subdiaphragmatic inflammation which do subside and for which surgical interference may be unnecessary. Perhaps it is not wholly accurate to call them abscesses in this stage. On the other hand, in the presence of a positive diagnosis of subphrenic abscess, early interference by the extraserous approach, either anterior or posterior, seems the logical one. Dr. Clute's success with the transpleural approach speaks for itself, however, and has given him excellent results. I cannot help but feel that Dr. Faxon has made a real contribution to the subject.

DR. TORR W. HARMER, Boston. This subject is interesting from its anatomical basis, and from the nicety of the Nather-Ochsner operation. In order to appreciate the adult anatomic relations it is necessary to consider the embryology, and to think of the liver as developing between the leaves of the anterior mesentery, which extends to the umbilicus with the umbilical vein in its free margin, and of the early attachment of the liver to the diaphragm posteriorly. Dr. Faxon spoke of the high attachment on the right side. If one follows the peritoneum up the anterior parietes onto the undersurface of the diaphragm, it becomes reflected onto the front face of the liver at the anterior margin of its attachment. If one ascends the posterior parietes, it passes over the right suprarenal gland and then onto the undersurface of the liver. These reflections onto the liver form the two leaves of the coronary ligament.

I think that with this embryological concept one can appreciate the anatomical situation. It is also interesting to do the Nather-Ochsner operation on cadavers, having performed this operation many times with medical students over a period of years, I am impressed with its anatomical nicety.

My own experience since Nather and Ochsner published their contribution in 1923 is meager. I have had only 6 cases, 2 were seen very late, the patients having scaphoid abdomens and being practically "skin and bone." One abscess was in the left posterior space, one in the right anterior space and four in the right posterior space. There were 2 fatalities, in one the abscess was in the right anterior space, and in the other it was in the right posterior space.

One thing which Dr. Faxon mentioned but which is worth emphasizing is the futility of the diaphragm on fluoroscopic examination. I had this impressed upon me by a case in which the diaphragm was pushed up but not fixed. There proved to be a solitary abscess of the liver about 8 cm. in diameter, and not a subphrenic abscess as I had at first thought. The fluoroscopic examination was repeated, and the radiologist still made a diagnosis of subphrenic abscess. I explored anteriorly and drained the abscess, with a successful outcome.

DR. IRVING J. WALKER, Boston. It seems to me that if right-sided subdiaphragmatic abscesses are difficult to diagnose, those on the left are even more so, at least in my experience. I wish to comment on 9 cases seen by me during the last four years. All these occurred following general peritonitis secondary to acute appendicitis. The story in each was similar: that of a patient who had had peritonitis associated with appendicitis. A pelvic abscess was drained in each case. This was followed by a persistent temperature which could not be accounted for.

Naturally we investigated the chest, the right subdiaphragmatic region, and finally, but usually rather late

the left. While this study was going on the patient would have a slight cough and complain of some very indefinite low grade pain in the left upper quadrant. The medical consultants usually said that there were rales at the left base consistent with atelectasis. Of course the latter existed, but, as later events showed it was due to a lesion below the diaphragm. Palpation showed slight tenderness below the left costal border.

X-ray examination done early in the course of the case usually showed a pneumonic process at the left base. The surgeon not being entirely satisfied, would naturally reason that perhaps after all there was a lesion beneath the diaphragm. The diaphragms were not elevated in all cases which did not rule out the possibility that there might be some lesion beneath them. It would seem to me that the important point of the x-ray examination lies in the fact that when the patient was examined under the fluoroscope it was found that the left diaphragm either was fixed or moved only slightly. I therefore lay greater stress on fixation of the diaphragm than I do on its elevation, since fixation occurred in all our cases. Of these 9 cases 8 were discovered and operated on. The ninth was not found until postmortem examination.

Our surgical approach in these cases was transperitoneal. We reasoned that these abscesses occurred as a result of unrecognized pelvic abscesses, or abscesses of the pelvis which had been allowed to remain undrained for too long a period of time, the result being slow seepage from the abscess up the gutter along the outer side of the sigmoid and descending colon, and finally an accumulation of pus under the left diaphragm. We justified our transperitoneal approach because of the fact that our incision would give dependent drainage, and that the peritoneal cavity would probably not again become infected, since it was already immune to the same infection as that which produced the subdiaphragmatic abscess.

All these cases were drained by an incision under the left costal border. We early found that it was necessary to use a large tube or two smaller tubes for drainage, and that we should not remove these tubes too early, other wise we would have a cavity under the diaphragm with a bottle necked sinus which would be insufficient to drain the abscess. From time to time we injected the cavity with Lipiodol, gradually removing the tubes and omitting them entirely when the sinus was very small. All the 8 patients who were operated on recovered.

DR. FAXON (closing). Apropos of what Dr. Clute has said in regard to possible damage to the pleura in the retroperitoneal type of operation, I should like again to stress the points brought out in Figure 6. From the studies of Melnikoff the pleural cavity never extends as low as the level of the first lumbar spine. This being the case, no contamination of the cavity can occur if the fascia be incised along the C-D rather than the line of skin incision and bed of the twelfth rib, A-B.

Another advantage of the retroperitoneal approach that I did not mention is the fact that with this operation both the right posterolateral and right inferior spaces are equally accessible for drainage, whereas with the trans-thoracic approach such latitude of exploration is impossible.

If the anterior spaces are to be drained, care should be taken that the incision along the lower costal margin goes to, but not through, the peritoneum. By blunt dissection the abscess can then be readily reached without entering the general peritoneal cavity.

I agree that it is most important that a sufficiently large opening be instituted and maintained in order to avoid a bottle neck type of abscess and premature blocking of drainage.

HEBERDEN'S NODES THE INCIDENCE OF HYPERTROPHIC ARTHRITIS OF THE FINGERS*

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CLEVELAND

HEBERDEN'S nodes are enlargements of the terminal interphalangeal joints of the fingers. Little detailed information concerning these enlargements is available, although they are mentioned frequently in the medical literature. They have been variously ascribed to gout and to rheumatoid arthritis, but it is the consensus that they are due to hypertrophic arthritis. This particular form of hypertrophic arthritis lends itself readily to statistical analysis because it constitutes a clear-cut clinical entity, the diagnosis can be made with reasonable certainty by looking at the fingers, the degree of involvement can be estimated quantitatively, and the disease is relatively common.

Most studies on the incidence of arthritis have been devoted to determining the proportion of the population disabled by rheumatic diseases.¹ Such investigations are of importance from the social, economic and public-health standpoints, but yield little or no information concerning the causes or nature of any particular disability.

The present study is an attempt to evaluate the influence of age, sex, race and occupation on the incidence of Heberden's nodes. It is undertaken with the hope that exact information concerning this particular form of hypertrophic arthritis will reveal characteristics which might not be apparent from studies of the disease in general.

LITERATURE

The syndrome derives its name from Heberden,² who first described it in 1802 as "digitum nodi." His description is so short as to warrant quotation in full. He wrote:

What are those little hard knobs, about the size of a small pea, which are frequently seen upon the fingers, particularly a little below the top, near the joint? They have no connection with the gout, being found in persons who never had it, they continue for life and being hardly ever attended with pain, or disposed to become sore, are rather unsightly than inconvenient, though they must be some little hindrance to the free use of the fingers.

Charcot³ gave a more complete and detailed description of the clinical and pathological characteristics of the disease, based on personal observation. He added that the end of the finger is often

bent a little to the right or left. Usually the onset is very obscure, however, there are attacks of redness, heat and temporary swelling of the soft parts, really exacerbations of the affection which the patients often regard as paroxysms of gout. "These nodosities are interesting to the observer," he said, "because they reveal a constitutional state which is none other than the rheumatic diathesis." Charcot noted that Heberden's nodes belong especially to old age but may be seen in young people, that the disease is hereditary, and that it occurs with partial rheumatism (hypertrophic arthritis). He stated that Heberden's nodes are often accompanied by asthma, migraine, neuralgia and muscular rheumatism, and that they are commonly seen in patients with cancer of the breast.

Duckworth⁴ mentioned that the disease is seen in people of advanced age, and agreed with Charcot that cancers of the breast and uterus are not infrequently associated with it. "When occurring in men without any pronounced gouty or rheumatic concomitant," he wrote, "they may support a general prognosis for longevity." He cited a case in which Heberden's nodes occurred in three generations. Duckworth quoted Begbie to the effect that they are seldom or never seen in the fingers of the industrious laborer or hard-working mechanic, but are found chiefly among the upper classes or the luxurious and well-fed or their dependents.

McCrae⁵ asserted that Heberden's nodes are commoner in advanced years but may occur in younger people. He mentioned a sixteen-year-old boy with large nodes occurring as part of a generalized arthritis. In another patient, a woman thirty-two years of age, the nodes developed rapidly in all the fingers. They may occur as the only manifestation of arthritis. McCrae mentioned the irregular distribution, the usual lack of serious symptoms and the deflection and deviation often seen in the terminal phalanges.

PATHOLOGY

The pathologic changes found in Heberden's nodes have been described by numerous observers. Charcot³ gave an excellent account of these changes. He said:

The articular cartilages undergo the velvety change, then they disappear, and an eburnated osseous layer

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is found in their place. The articular surfaces enlarge in all directions on account of the growth of osteophytes, which almost exactly reproduce in an exaggerated form their shape and natural contours. There is no trace of sodium urate deposits either in the substance of the articular cartilage or in the soft part in the neighborhood of the joints.

Nichols and Richardson⁶ in 1909 asserted that Heberden's nodes were due to degenerative (hypertrophic) arthritis. Their description of the changes in the cartilage found in degenerative arthritis is quite similar to that given by Charcot. They stated that the changes consisted in an increase in the activity of the perichondrium, resulting in the new formation of cartilage which might be transformed into bone.

Brogssitter⁷ examined histologically the nodes of 17 fingers. He found the characteristic changes of hypertrophic arthritis, namely irregular erosion and fibrillation of cartilage, cystic and fibrotic areas in the hyperemic bone marrow, and spur formation. The most interesting findings, however, were in the small blood vessels. These lesions consisted of typical arteriosclerotic changes with narrowing of the lumen by intimal proliferation and even complete occlusion of the vessels with old and canalized thrombi. The media was infiltrated with round cells, in places to a sufficient degree to lead to rupture of the vessels and hemorrhage into the surrounding tissue. Because of these findings Brogssitter believed that Heberden's nodes occurred as a result of decreased circulation in the bone and disturbance in nutrition of the joint cartilage. He found uric acid tophi in 3 of the 17 fingers examined, but thought that Heberden's nodes in general were due to hypertrophic arthritis.

Stockman⁸ concluded that Heberden's nodes were not a manifestation of osteoarthritis because he "examined a number of specimens all of old standing and did not see the peculiar changes characteristic of true osteoarthritis. In all the joint had remained intact, and the cartilage was normal in appearance."

ETIOLOGY

Before Heberden's time, nodules on the fingers were considered to be typical manifestations of gout. Heberden² did not know their cause but disagreed heartily with the conventional view of the time. Charcot³ believed they were a special form of chronic rheumatism having nothing to do with gout. Garrod⁹ stated that Heberden's nodes might be regarded as constituting the slightest and most chronic manifestations of rheumatoid arthritis, and that their formation appears to be of the nature of a senile change. He employed the term rheumatoid arthritis¹⁰ to include

chronic arthritis of all types. Duckworth⁴ thought that some cases of Heberden's nodes were due to gout, and quoted Begbie, who was convinced of the occasional gouty nature of the disease. Brogssitter⁷ found uric acid tophi in 3 of the 17 nodes examined, but thought that the nodes in general were due to hypertrophic arthritis. Stockman⁸ did not commit himself as to their true nature except to doubt that they were caused by hypertrophic arthritis. McCrae⁵ mentioned their occurrence in gouty patients but believed them to be usually a manifestation of arthritis deformans. Fox and Van Breeman¹⁰ regard the condition as a form of gout modified by sex.

Cecil¹¹ states that Heberden's nodes are a form of hypertrophic arthritis but that the cause is not known. He is convinced that they are related in some way to repeated trauma because they occur most frequently in people who use their hands continually. Cecil does not mention the menopause as a cause of Heberden's nodes, but says that the diagnosis of menopausal arthritis is justified if on examination there is crepitation without swelling of the knees and Heberden's nodes of the fingers. Hench¹² believes that Heberden's nodes are a form of hypertrophic arthritis. Concerning the influence of trauma he writes, "Heberden's nodes are seen no more frequently, indeed perhaps less frequently, in elderly typists and needleworkers than in congenital dowagers contrary to expectation if trauma was a prime cause." Dawson¹³ states that the nodes constitute one of the commonest of all forms of osteoarthritis, and most commentators^{2-5, 7, 10-13, 15-21} agree that they are typical manifestations of hypertrophic or osteoarthritis.

PLAN OF STUDY

This study was undertaken in order to determine the incidence of Heberden's nodes in the general population, analyzed according to race, sex, age and occupation. It reveals the proportion of individuals having several degrees of involvement of Heberden's nodes at any one time in the various race, sex, age and occupational groups. In order to accomplish this object I have examined nearly 7000 adult subjects. Most of these people were seen on the wards or in the dispensaries of two public hospitals in Cleveland. Because of the scarcity of elderly patients in the dispensary and hospital population, the inmates of several homes for the aged were included. Efforts were made to employ random sampling and to avoid bias, so far as possible. Subjects were examined only in groups as in a dispensary waiting room, a hospital ward or a section of an old folks home, and every one of the group was included in the

tabulation Isolated observations were excluded, since it was believed that such observation might bias the results because of the temptation to include occasional, affected individuals to the exclu-

ease had been well and active until a few years before observation, and had therefore led a normal existence until quite recently So far as Heberden's nodes are concerned, I believe that

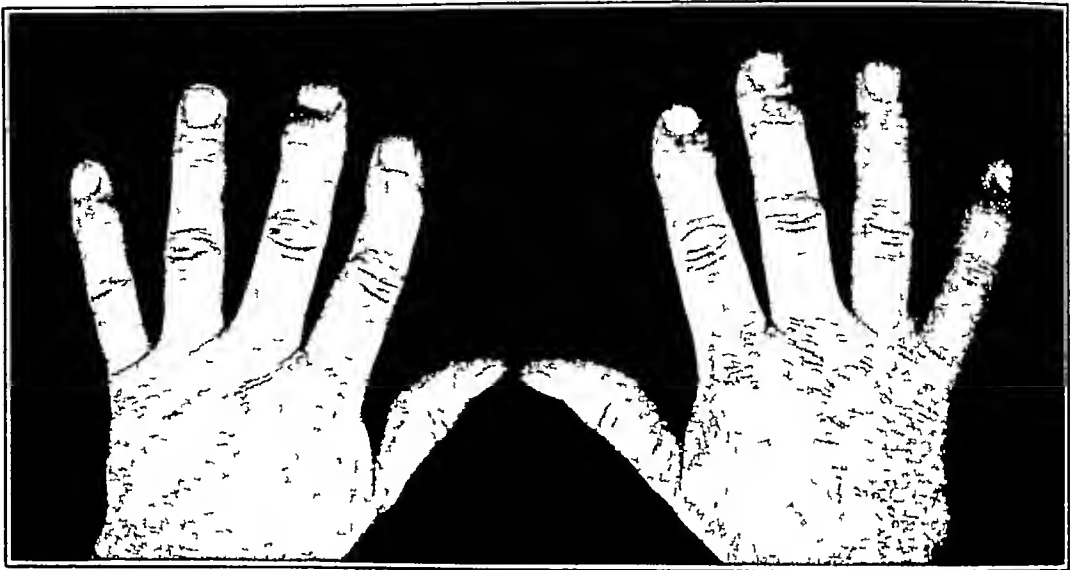


FIGURE 1 *Idiopathic Heberden's Nodes*
The fourth fingers show only enlargement, the other fingers also show flexion deformity, and the index fingers, lateral deviation The thumbs are not affected

sion of normal subjects My private patients also were excluded because of the high proportion of arthritic patients in this group

the subjects of this study represent a fair sampling of the working people of the moderate-income and low-income groups of Cleveland For comparison

TABLE 1 *Analysis of 6913 Subjects Examined for Heberden's Nodes, Classified as to Race, Sex, Age and Occupation.*

| CLASSIFICATION | NO OF SUBJECTS IN DIFFERENT AGE GROUPS | | | | | | | | |
|--|--|-------|-------|-------|-------|-------|-------|-------|-----|
| | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90+ |
| 2233 white men (hospital population) | | | | | | | | | |
| Total subjects | 115 | 324 | 306 | 446 | 439 | 353 | 203 | 44 | 3 |
| Affected subjects | 2 | 28 | 27 | 51 | 84 | 101 | 65 | 13 | 2 |
| 2187 white women (hospital population) | | | | | | | | | |
| Total subjects | | 500 | 498 | 512 | 306 | 207 | 125 | 34 | 5 |
| Affected subjects | | 1 | 18 | 34 | 47 | 57 | 51 | 12 | 3 |
| 846 Negro men | | | | | | | | | |
| Total subjects | | 184 | 249 | 191 | 131 | 75 | 16 | | |
| Affected subjects | | 16 | 16 | 20 | 17 | 16 | 3 | | |
| 1117 Negro women | | | | | | | | | |
| Total subjects | | 330 | 346 | 255 | 124 | 48 | 12 | 2 | |
| Affected subjects | | 0 | 9 | 7 | 5 | 8 | 3 | 1 | |
| 530 white physicians | | | | | | | | | |
| Total subjects | 104 | | 147 | 165 | 73 | 34 | 7 | | |
| Affected subjects | 2 | | 7 | 8 | 10 | 5 | 1 | | |

The fact that the group observed was composed of the hospital population and not of normal individuals does not impose any serious inaccuracy for the purposes of the present study, for none of these people sought hospital care because of Heberden's nodes Most of the patients were in good health except for some minor or acute illness which had no bearing on the presence or absence of the nodes Even those with chronic dis-

with a different social and economic group the study includes a tabulation of over 500 physicians.

TECHNIC

Notations were made on a separate card for each subject, the name, race, sex, age and the abnormalities of each finger being recorded The positive and negative cards were separated, and each of these groups was then sorted as to race, sex and

age by decade. The cards were filed alphabetically in the proper classification. When a subject was seen for the second time, this card was found upon filing to be a duplicate and was discarded.

Three degrees of involvement of affected fingers were described by a simple system of notation. These are, in the order of increasing severity, as follows: enlarged, enlarged and flexed, enlarged, flexed and deviated. Enlargement of the joints sufficient to be visible and palpable was considered necessary for a diagnosis. This enlargement is occasionally apparent as two small nodules on the dorsolateral aspect of the terminal joint, but

As experience accumulated during the progress of these observations it became apparent that Heberden's nodes developed in two different ways. Individuals with involvement of only one finger or of several fingers of the same hand usually attributed the deformity to a definite injury. Trauma resulted in swelling and pain followed shortly by deformity that reached its final stage within a few months, after which no further change occurred. This condition has been designated as *traumatic* Heberden's nodes.

Individuals with the fingers of both hands deformed usually stated that the disease began with

TABLE 2. Percentage Incidence of Heberden's Nodes Found in 6913 Subjects Classified as to Race, Sex, Age and Occupation

| CLASSIFICATION | PERCENTAGE INCIDENCE BY AGE GROUP | | | | | | | | | |
|---|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|------|--|
| | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90+ | |
| 2233 white men (hospital population): | | | | | | | | | | |
| Total incidence | 1.7 | 2.6 | 2.8 | 11.4 | 19.1 | 28.6 | 32.0 | 29.5 | 66.7 | |
| Traumatic nodes | 1.7 | 7.1 | 2.0 | 9.2 | 15.5 | 23.2 | 23.6 | 11.4 | 33.3 | |
| Idiopathic nodes | 0.0 | 1.5 | 1.0 | 2.2 | 3.6 | 5.4 | 8.4 | 18.2 | 33.4 | |
| 2187 white women (hospital population): | | | | | | | | | | |
| Total incidence | | 0.2 | 3.6 | 6.6 | 15.4 | 27.5 | 40.8 | 32.3 | 60.0 | |
| Traumatic nodes | | 0.2 | 3.2 | 5.7 | 12.7 | 12.1 | 16.8 | 5.9 | 0.0 | |
| Idiopathic nodes | | 0.0 | 0.4 | 1.0 | 2.6 | 15.5 | 24.7 | 29.4 | 60.0 | |
| 846 negro men: | | | | | | | | | | |
| Total incidence | | 2.7 | 6.4 | 10.5 | 13.0 | 21.3 | 18.8 | | | |
| Traumatic nodes | | 2.2 | 6.0 | 10.0 | 9.9 | 14.7 | 17.5 | | | |
| Idiopathic nodes | | 0.5 | 0.4 | 0.5 | 3.1 | 6.6 | 6.3 | | | |
| 1117 negro women: | | | | | | | | | | |
| Total incidence | | 0.0 | 2.6 | 2.7 | 4.0 | 16.7 | 25.0 | 50.0 | | |
| Traumatic nodes | | 0.0 | 2.3 | 2.7 | 4.0 | 14.6 | 16.7 | 50.0 | | |
| Idiopathic nodes | | 0.0 | 0.3 | 0.0 | 0.0 | 2.1 | 8.3 | 0.0 | | |
| 550 white physicians: | | | | | | | | | | |
| Total incidence | | 1.9 | 4.8 | 4.8 | 13.7 | 14.7 | 14.3 | | | |
| Traumatic nodes | | 1.9 | 4.8 | 4.8 | 11.0 | 11.8 | 14.3 | | | |
| Idiopathic nodes | | 0.0 | 0.0 | 0.0 | 2.7 | 2.9 | 0.0 | | | |

more frequently is noted as a definite ridge across the dorsum. At times enlargement is found to be soft or even fluctuant. When the disease occurs in a more advanced form, this enlargement extends to the lateral aspects of the joint also, and finally in extreme cases is evident by palpation on the palmar surface. As enlargement increases the bone deformity is associated with flexion of the terminal phalanx. In advanced stages the finger shows not only palmar flexion but also lateral deviation toward either the radial or the ulnar side. In rare cases there may be involvement of the proximal interphalangeal joint, evidenced by the presence of deformity, enlargement and limitation of motion.

The description thus far has concerned a single finger. Several fingers are often involved. The degree of involvement affecting the different fingers varies considerably, but rarely are all the fingers involved to an extreme degree. The thumbs seem to be comparatively immune, perhaps because there is no second interphalangeal joint of the thumb. Involvement of the toes has not been observed.

pain and swelling of one finger, that other fingers became successively involved that deformity gradually increased and that the disease progressed for several years until the condition became stationary. In this group the changes seemed to arise spontaneously without reference to injury or associated disease, and the condition has therefore been designated as *idiopathic* Heberden's nodes.

For the purposes of statistical study, an arbitrary distinction has been made between the traumatic and idiopathic nodes. Subjects with involvement of less than flexion degree of one finger of each hand have been considered to have traumatic Heberden's nodes. Subjects, therefore, who had involvement at least to flexion degree of one finger of each hand were considered to have idiopathic Heberden's nodes. Inasmuch as histories were not obtained from these subjects (except for the information recorded on the card), an exact discrimination in individual cases was not possible. It must be emphasized that this differentiation into traumatic and idiopathic nodes is only ap-

proximate, but it serves a useful purpose in distinguishing degree of involvement, and reveals certain definite trends which seem significant

Figure 1 illustrates the typical appearance of Heberden's nodes. The fourth fingers show only

The observations upon which this study is based are presented in two tables and a chart. Table 1 shows the total and the affected subjects observed in the different race, sex, age and occupation groups. Table 2 presents the same material in

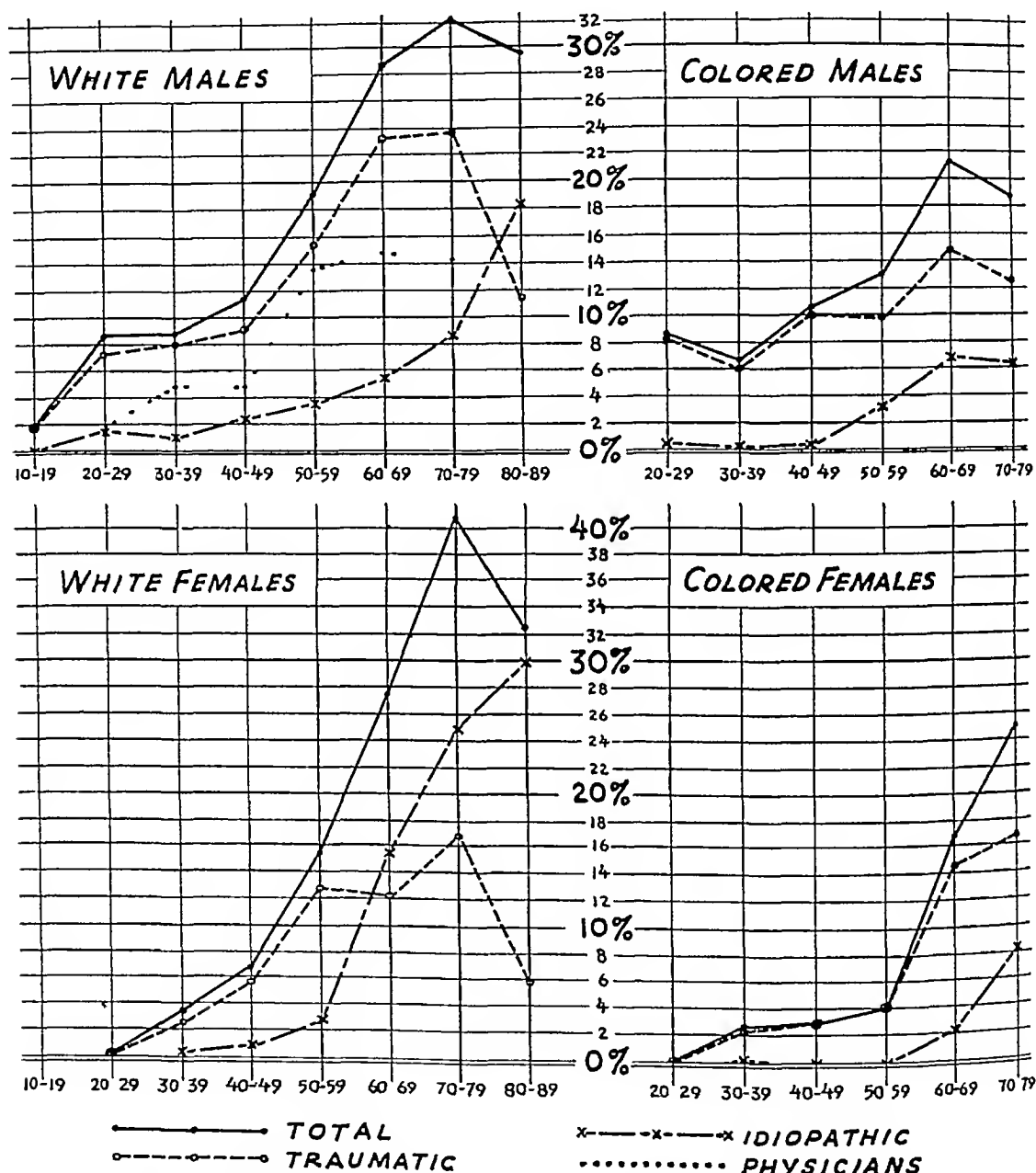


FIGURE 2 The Percentage Incidence of Heberden's Nodes in 6913 Subjects, Classified as to Race, Sex, Age and Occupation

The total incidence has been subdivided into traumatic and idiopathic for all groups except physicians

enlargement of the terminal joint. The other fingers show flexion deformity as well as enlargement. The index fingers show also lateral deviation of the terminal phalanges. The condition of any one of these fingers might have resulted from trauma. It is extremely unlikely that trauma affected all of them. The picture is one of idiopathic Heberden's nodes.

percentage form. The total incidence and the incidences of traumatic and of idiopathic nodes are indicated for each subgroup. The information in Table 2 is presented in graphic form in Figure 2, because of the small number of persons, the white subjects over the age of eighty-nine and the colored subjects over seventy-nine have been omitted. The percentages in the last-mentioned

groups are completely out of line with the trend in the other classification. The group of physicians observed between the ages of seventy and seventy nine was similarly small, but has been included because all the groups in the physicians are small and the last named group conforms to the general trend. It will be seen that twenty four of the thirty six age groups shown in Table 1 include 100 or more individuals.

DISCUSSION

Several possible sources of error in this study deserve mention. The problem of diagnosis in borderline cases is so different in this condition from what it is in any other disease. Inasmuch as the observations were all made by me the same rules and the same criteria prevailed in all observations. Clubbing of the fingers is never a source of confusion. In this condition the enlargement is confined to the terminal phalanx, the enlargement is greater at the end of the phalanx than it is at the joint, and the fingernail is distinctly enlarged and rounded in both diameters. Two other conditions are more puzzling and caused some difficulty in the beginning. One is flexion of the terminal phalanx without arthritis or enlargement of the joint, which occurs with rupture of the deep extensor tendon. Ability to extend the terminal phalanx is lost, but passive extension is full and complete. Deviation of the little finger occurring symmetrically as a hereditary trait is also without enlargement or arthritis of the joint. Certain sources of statistical error are worthy of comment. No note was made of missing fingers. Patients with one hand, 1 with claw hands and 1 with webbed fingers were omitted.

The age in every case was recorded as given by the subject. Many Negroes are uncertain as to their exact age and seem to be careless in their statements concerning it. It is thought that middle aged white women are inclined to underestimate their age. These inaccuracies cause no practical difference and introduce only a slight statistical error. According to the system of tabulation used, no error whatsoever is introduced unless the age is given in the wrong decade. The classification according to race is social rather than anthropological.

Trauma

Trauma is a definite cause of many cases of Heberden's nodes, especially in subjects with involvement of one finger or of several fingers of one hand. Inquiry recalled a specific injury often accurately dated, directly involving the affected fingers. Such injury was followed by a painful swelling, leading in the course of several months to a painless deformity, which remained un-

changed thereafter. Baseball injuries, such as a blow on the end of the finger by a fast ball, were predominant among younger men and boys, but were also described by older individuals. One subject with deformities of most of the fingers of the left hand said that he had been a left handed catcher. Another subject, aged sixty five, with deflection deformity of the right forefinger, had suffered a dislocation of that finger forty five years previously when struck on the end of the finger by a fast-pitched ball. No change had been noted in this condition since the first few months after the accident. Several women with one enlarged finger attributed it to a baseball injury. Injuries received in other sports, such as football, basketball and skating, were followed by similar results. Industrial accidents played an important role. It was not uncommon to find cases of traumatic amputation with Heberden's nodes on the adjacent fingers.

The inclusion of traumatic arthritis of the terminal interphalangeal joints in the category of Heberden's nodes is justified. In this study any enlargement of these joints due to hypertrophic arthritis is considered as Heberden's nodes, and traumatic arthritis is considered to be hypertrophic arthritis. According to Doub,²² traumatic arthritis has come to mean those chronic changes, such as synovial thickening, necrosis of the cartilage with narrowing of the joint space, and bone proliferation, which resemble arthritis and occur in and around a joint after injury. This arthritis simulates the type which goes by the name "hypertrophic (osteoarthritis or arthritis deformans)." Doub further states that traumatic arthritis must satisfy the following criteria: there must be proof of injury and of its severity; the injury must have been applied directly to the joint in question; information must be obtained as to the previous function of the joint in question; the time interval between injury and the occurrence of pathologic changes must be within the generally accepted limits (three to six months or perhaps a year); there must be clinical and roentgenologic evidence of pathologic tissue change. Doub quotes several authorities (Axhausen, Engelhardt and Blencke) who believe that injury must be severe enough to damage cartilage before traumatic arthritis ensues. Leriche,²³ on the other hand, believes that traumatic arthritis results from cartilage damage due to a hyperemic reaction following local traumatic shock. Allison and Ghormley²¹ state that true traumatic arthritis is indistinguishable microscopically from degenerative arthritis. Traumatic Heberden's nodes conform to all the requirements of traumatic and therefore of hypertrophic arthritis.

The histories obtained from subjects with idiopathic nodes are in striking contrast to those obtained from subjects with traumatic nodes. In the former cases no history of injury can be elicited. The nodes arise spontaneously without coincident illness or recognizable predisposing cause. The affection of one finger is followed by involvement of more fingers one after the other for a period of months or years. In the beginning swelling may be soft or even fluctuant, there may be slight redness and tenderness, but these symptoms disappear when the final nonprogressive stage of the deformity is reached. The so-called wear and tear of everyday life has been blamed, especially in people who have worked hard, but this is an unsatisfactory explanation. The condition occurs in hard-working people, as this survey indicates, but severe Heberden's nodes are frequently encountered in women of the leisure class. Further consideration of the constitutional and environmental factors in the etiology of idiopathic Heberden's nodes will be discussed in another study. It should be noted that it is impossible to distinguish in a single joint between traumatic and idiopathic Heberden's nodes by clinical and roentgenological examination alone and without reference to the history.

The arbitrary classification into traumatic and idiopathic Heberden's nodes necessitated by inadequate history of the subjects of this inquiry leads to individual cases of error. Certain it is that some individuals develop nodes on the fingers of both hands as a result of trauma and are erroneously classified as having idiopathic nodes. Conversely, subjects developing idiopathic nodes are occasionally seen in a stage when only one finger or several fingers of the same hand are involved and are classified erroneously as having traumatic nodes. Such errors are in the opposite direction and tend to cancel the previous ones. A curious effect of what may be inaccuracy of classification is seen in the chart concerning white subjects. The incidence of idiopathic nodes increases gradually until a certain age,—seventy-nine for men, fifty-nine for women,—after which the incidence increases very rapidly. Coincident with this rapid rise of incidence of idiopathic nodes, the incidence of traumatic nodes falls. It seems possible that the apparent increase of traumatic nodes before this trend is altered may in reality be due to the development of idiopathic nodes which have not reached the stage at which they are recognized as such. Even though the arbitrary classification into traumatic and idiopathic types may introduce certain errors, the figures on the incidence of the different degrees of severity of

Heberden's nodes are believed to be thoroughly reliable.

Age

Age is a definite factor affecting the incidence of Heberden's nodes, the incidence increasing as age advances. This is demonstrated for both idiopathic and traumatic nodes, regardless of sex, race or occupation. Heberden's nodes are seen in the third decade among all groups except Negro women. They are seen in the second decade in white men, the only group in which this age was investigated. Traumatic nodes are common in men, even at early ages, and are relatively rare in women. They increase with advancing years in almost every group, though the rate of increase is irregular and varies in different groups. Idiopathic nodes are rare at early ages, the incidence shows a gradual and regular increase with age. After the age of fifty-nine in white women and sixty-nine in white men and Negro women the increase is more rapid. Heberden's nodes are permanent deformities which, once developed, remain for life. The incidence is cumulative, and each new increment, as it occurs, is added to the increment already present. In any group of the population, the incidence will increase with advancing age so long as the factors causing them are operative.*

Sex

Sex is an important factor in determining the incidence of Heberden's nodes, in both white and Negro subjects. The incidence of traumatic nodes is higher in men than in women as early as the third decade, and increases at a higher rate throughout life. This difference can be attributed to environmental factors rather than to true sex differences. The educational, recreational and occupational activities of men differ considerably from those of women. The sports which they enjoy, baseball, football and basketball, are much more likely to produce finger injury than are those in which women usually indulge. In the shop, the fingers of many men are constantly exposed to industrial accidents. Men and women seem to be equally exposed to certain injuries in their homes and private lives which lead to Heberden's nodes, such as pinching of the fingers in doors and other minor household accidents.

Race

A comparison of the incidence of Heberden's

*Even in the face of these conditions a decreasing incidence in advanced years is a theoretical possibility. Two conditions would be necessary. The presence of Heberden's nodes would have to be associated with an increased death rate to such an extent that these subjects would disappear faster than that part of the population which was free of Heberden's nodes, and faster than new cases developed. Such was not the case, however, among the subjects examined.

nodes in white and Negro subjects reveals certain differences. The gross incidence is higher in Whites. The difference is slight before the age of fifty, after which it becomes substantial. In men, this difference is almost entirely due to the markedly higher incidence of traumatic nodes in Whites. In women the incidence of traumatic nodes is essentially the same in both races except in the fifth and six decades, in which white women are affected respectively two and three times as frequently as Negro women. The incidence of idiopathic nodes in white and Negro males is essentially the same at all ages. Idiopathic nodes are rare in Negro women, in contrast to the high incidence found among white women. This is surprising in view of the fact that Negroes are more susceptible than are white people to the so-called degenerative diseases. The death rate from chronic nephritis, organic diseases of the heart, cerebral hemorrhage and other diseases of the arteries is distinctly higher among Negroes^{21, 22} than it is among white people. Negroes are said to succumb to hypertensive heart disease on the average ten years earlier than do Whites. Despite the susceptibility of Negroes to disease of the small arteries, and the evidence that small artery disease is a factor in the production of Heberden's nodes, this condition is rare among Negroes.

Occupation

Occupational factors seem to affect the incidence of Heberden's nodes only in so far as they influence the hazard of finger injury. The gross incidence in physicians is distinctly low in all age groups. The incidence of traumatic nodes in physicians is one half or less in all age groups save the sixth decade, in which it reaches two thirds. The difference in the third decade is striking. It appears that this decade is specially hazardous for workmen, so far as finger trauma is concerned. At this period of life physicians are in medical school, in hospital service or early practice. They have relatively little time for athletic sports and they are finger-conscious. The incidence of idiopathic nodes in physicians, while lower, appears to be approximately the same as that found in workmen. This suggests that environmental factors, working conditions, housing, clothing, diet and other refinements of living are not important in the production of Heberden's nodes. The number of physicians observed in the upper age groups is so small as to cast considerable doubt on the reliability of the figures for idiopathic nodes.

General Considerations

Observations on a large number of individuals

of various ages have revealed the incidence of Heberden's nodes. Similar results would be obtained by observing the incidence of Heberden's nodes as they occur at different ages in a large group of individuals who are examined repeatedly and periodically. From a statistical standpoint, and so far as Heberden's nodes are concerned, we may assume, for instance, that the white working males seen in the seventh decade present a picture similar to that which the white males of the third decade will show forty years later. We have, so far as Heberden's nodes are concerned, repeatedly observed the equivalent of five different groups, each numbering several hundred individuals, over a period of fifty or sixty years.

The probability of an individual's having hypertrophic arthritis of the fingers (Heberden's nodes) has been demonstrated, to increase with age. Although the rate of increase varies considerably in the different classifications, the trend is apparent in each of the sex and race groups. Glover²³ found an increasing incidence with advancing age in a clinical study of hypertrophic arthritis in general. Heine²⁷ and Keefer et al²⁸ have demonstrated it in extensive pathological studies of other human joints. There is experimental evidence of an increased susceptibility to degenerative joint disease with age. Pemberton et al²⁹ were able to produce bony spurs on the patellas of old dogs by interference with the blood supply but were relatively unsuccessful when working with young dogs. Despite these findings, the present study reveals that hypertrophic arthritis of the fingers occurs in the second decade in white men, in the third decade in white women and Negro men and in the fourth decade in Negro women.

SUMMARY

Heberden's nodes (enlargements of the terminal finger joints due to hypertrophic arthritis) occur as a result of direct trauma or arise idiopathically.

A clinical history permits accurate differentiation of these two types, which may otherwise be indistinguishable. An arbitrary classification, based on degree of involvement has been adopted for this study.

The incidence of both types was determined by examination of nearly 7000 individuals. The incidence was analyzed according to race, sex, age and occupation.

The incidence of both types tends to increase with age in all groups.

The incidence of traumatic nodes is higher in men than in women, is higher in workmen than in physicians, and is higher in white working people than in Negroes. The differences be

tween various groups of white people seem to depend on differences in exposure to finger trauma

The incidence of idiopathic nodes is universally low before the age of sixty, after which it increases very rapidly in white women. It increases much more slowly in workingmen of both races, but remains very low in Negro women.

The low incidence in Negroes of both types of Heberden's nodes is not readily explainable.

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DELINQUENCY*

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CRIME, of all the social problems, is the most interesting. The fact that so many different types of people of all ages are fascinated and intrigued by a criminal career that it is portrayed from many different angles in books, at the theater, on the screen and over the radio, bears witness that crime makes a strong emotional appeal to the masses.

Poverty may be more widely distributed, affect more people, cause more real deprivation, be fundamentally more important as a social problem, but compared with crime it is drab, ordinary, lacking in thrills and held in the contempt which familiarity is said to breed.

Disease, too, as a social problem is without much romance. It may awaken pity or disgust. As a topic of conversation it is often evaded or prohibited as was the public discussion of social diseases until recently. There is a certain morbidity about disease that precludes it from becoming a

subject of universal interest. Not so with crime. The more vicious, the more frightful, the more disgusting, the more demoniacally ingenious it may be, the more it is publicized and accepted as a topic for barroom or drawing-room conversation. An atrocious murder by a feeble-minded delinquent would receive more news space than would the discovery of the cause of some baffling disease. Journalists are in the business of giving the public that which it wants and for which it is willing to pay.

There is probably no one answer to the universal interest in crime. One individual is intrigued by the ingenuity with which a particular crime has been carried out. Another is concerned with the sociopolitical aspects of crime in general and the fact that as a business crime has become well established and relatively safe. Some people unquestionably derive a degree of vicarious satisfaction through their interest in the criminal activities of others. In this way they are able to enjoy the freedom from restraint expressed by the anti-social activities of the criminal group, yet remain innocent themselves of open defiance of authority.

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and immune to the fear of detection and the feelings of guilt which participation in criminal behavior would invoke. There is no doubt that a large number of highly respected, law abiding citizens harbor repressed desires to indulge in asocial activity, and find in the criminal activities of others an outlet for these desires. Crime is no longer the activity of the isolated individual. It has become so well organized, so carefully planned, so skillfully executed and so cleverly protected that it must be considered in the light of an epidemic that requires searching investigation in order to determine the source of the contamination, as well as the detection, confinement and treatment of the individuals involved.

There is also a small group of people who go a step farther and attain what appear to be strange thrills through identifying themselves with crime and the criminal activities of others, owing to a strong unconscious urge for adventure or revenge, or perhaps merely the desire to put themselves across after repeated failures along socially approved lines. These individuals are the so-called psychopaths. There are many and varied reasons for this morbid psychopathic interest in crime. It is generally recognized that there is no common background for crime, and that we can not draw any sharp line of demarcation when we consider the varied groups into which criminals fall. Each and every person committing a criminal act must receive individual consideration. However, for purposes of understanding crime as a problem affecting society, we recognize that there are common factors which stand out and appear to give value to an attempt to make some generalizations about the more important biological, sociological and psychological aspects of crime.

The delinquent and the criminal are individuals whose concepts of right and wrong are out of harmony with those of society. There invariably exists a discrepancy between what the delinquent feels he is entitled to in life and what society allows him to have. The aggressive, non-conforming individual, in his effort to evade, avoid or defy the rules and regulations set up by the community in which he lives, eventually finds himself in conflict with the police, probation officer, truant officer and others appointed to maintain so-called law and order.

Delinquent careers do not begin, however, with the child's first contact with the truant officer or the neighborhood policeman, nor do they end after the child has been apprehended and brought before the judge in a juvenile court. Delinquent activity of the chronic type, characteristic of the individuals who fill our correctional institutions, which eventually develops into a life of crime, is

not the product of a few days or weeks. The state of mind, the habits, the attitudes and the personality traits that are the basis of criminal careers are in the process of development for years before they receive the official and legal stamp which marks the criminal. In other words, the fundamental basic factors, whether they be biological, sociological or psychological, are usually operating 10 or on the individual years before his behavior takes on a definite overt criminal pattern.

Every delinquent and criminal must be considered in terms of his own particular and oftentimes peculiar personality make up, as well as the varied environments and contacts with all their pitfalls and hazards, but for the purpose of acquiring a better orientation to the more important contributory causes of crime, I shall consider for the moment the three main groups in relation to the etiology of crime.

The first is biological and is conditioned by the inherent physical defects or instabilities that are frequently associated with criminal careers and that when operating under certain conditions must be looked upon as being the leading contributory cause.

Mental defectiveness as a cause of delinquency has long been recognized, and its importance as a causative factor has swung through a wide arc. During the early days when psychological tests were being received with unbounded enthusiasm mental deficiency was given the most important place in the etiology of crime. For example, Sutherland,¹ on reviewing the statistics on this subject, found that from 1910 to 1914 there were 50 per cent feeble minded patients among delinquents from 1915 to 1919 28 per cent from 1919 to 1924, 21 per cent and from 1924 to 1928, 20 per cent. The last figure is a fairly conservative estimate of the frequency of mental deficiency among delinquents, but it is necessary to point out that as a cause of crime it must not be considered alone but must be studied in relation to other factors.

The relation between mental retardation and juvenile delinquency should not be difficult to determine. However in the literature there does not appear to be any consensus on the subject. Thompson, of the Department of Hospitals, Psychiatric Clinic, Court of the General Sessions, New York City states "The percentage of defectives is no greater among criminals than among the civil population. Therefore, mental defect cannot be given a prominent place as a factor causative of crime." On the other hand, Glueck,² in her investigations relating to mental retardation and juvenile delinquency, states

(1) There is a far higher proportion of children of lower intelligence among delinquent groups than

in the general population of children, (2) the likelihood of delinquency among children of lower intelligence is greater than among those of higher intelligence, and (3) the families of young delinquents of lower intelligence are far less able than those of higher intelligence to participate constructively in any program for the supervision and treatment of such children

My own experience would lead me to agree with Glueck's conclusions. In a recent study of a group of predelinquent children which were followed up over a period of ten years or more, I was impressed with the fact that there was a far greater tendency for the predelinquent children under ten years with low IQ's to continue a life of delinquency than there was for the children with high IQ's. This does not necessarily mean that a poor intellectual endowment of itself is the cause of delinquency. It does mean, however, that under the existing social and economic conditions these children are subjected to stresses and strains of life of such a nature and of such intensity that failure to meet them successfully is almost inevitable, unless they are given special aid in making a place in the social and economic world.

Mental disease, although rarely diagnosed in children during the first decade, is undoubtedly in the process of development, and some of the strange, peculiar, unpredictable behavior during this early period, as well as the less obvious evidences of personality disorder, are but the beginnings of mental abnormalities. The inherently shy, diffident, shut-in type retreats from the scene of conflict and evades competition by protecting himself with a neurosis, while the more aggressive often finds delinquency an avenue of escape.

In passing, one can only mention the asocial activity associated with epilepsy, encephalitis lethargica and the abnormal behavior which frequently follows damage to the nervous system occurring at all ages.

Considerable attention has been given to the role which the endocrine glands play in affecting behavior. Lurie⁴ found that 20 per cent of the behavior disorders studied at the Child Guidance Home in Cincinnati, Ohio, showed endocrine disturbances, and that in 93 of the 1000 cases studied there was a direct relation between the glandular dysfunction and the behavior difficulty. Rowe,⁵ in his analysis of 104 cases of behavior disorder in children, found that 68 had an associated endocrine disorder. Whether or not these figures exaggerate the extent to which glandular dysfunction is associated with behavior is not so significant as the fact that careful investigation of the physical side of the child's life is of importance.

The psychiatrist as a specialist in the field of mental aberrations, and as a physician, has a

valuable contribution to offer in this particular field. Therapy so far as these biological defects and acquired handicaps are concerned depends very largely on the early recognition of the problem in order that adequate study, treatment, care and supervision can be instituted. Recidivism should be materially curtailed by the early recognition of the group of delinquents who are not likely to profit from experience. Victims of crime, grief-stricken parents and irresponsible delinquents would all profit by an early recognition and an intelligent plan of supervision. The defectives as a group are problems only when poorly adjusted*. When they are recognized early, a plan for training can be instituted which will permit many of them to fit into a social scheme of life on a certain level so that they may evade competition with those intellectually superior, and avoid inevitable failure, which so frequently leads to delinquency. One must keep in mind that crime is not being considered as a biological problem *per se*, but that the fact is being recognized that there exist biological handicaps which are conducive to criminalistic behavior.

The largest and by far the most important group in our etiologic classification are those delinquents whose asocial behavior can be attributed to a very large extent to sociological factors which need not be considered permanent, inevitable or irresistible to change. In fact, demonstrations⁶ have already been made showing conclusively that the delinquent rate in certain city areas is many times higher than it is in others, that in some of these areas as many as 15 to 25 per cent of the boys between the ages of ten and seventeen are arrested for delinquency in any one year, and that approximately 43 per cent more of the delinquents in the delinquency areas are recidivists than in the outlying neighborhoods where the rates are relatively low. Furthermore, delinquency rates can be reduced by improving the sociological conditions under which these individuals have to live.

I need not enter into any prolonged discussion at this time as to the relative importance of environment and heredity, since I am not embarking on a dissertation to prove that environment and its sociological pitfalls are the cause of all delinquency. I am simply stating that as one of the leading factors contributing to delinquency, they warrant serious attention. It is an undisputed fact, and has been shown over and over again, that delinquency is frequently associated with poverty, vice and disease.

*Dr. Walter Fernald, a keen student in the field of mental defects, entertained the idea for years that mental deficiency was relatively rare, that defectives were all potential delinquents and that they should all be in institutions. With the courage characteristic of a great man in the latter part of his life he reversed these opinions and conceded that while there were many defectives few were bad and only a small portion should be in institutions.

A brief review and comparison (Table 1) of the results found in two investigations—the first by the Gluecks,¹ in which the social background

TABLE 1 *Effect of Social Background.*

| SOCIAL BACKGROUND | WELL-ADJUSTED GROUP | DELINQUENT GROUP |
|--|---------------------|------------------|
| | % | % |
| Home and neighborhood: | | |
| Home conditions average or better | 78 | 38 |
| Neighborhood conditions average or better | 95 | 15 |
| Economic status: | | |
| Families dependent or on verge of dependency | 13 | 76 |
| Employment of mothers: | | |
| Mothers gainfully employed | 14 | 42 |
| Nativity of parents: | | |
| Nati-born parents | Over 60 | 20 |
| Education of parents: | | |
| Illiteracy | Less than 1 | 29 |
| Attended or graduated from high school | 46 | 10 |
| Attended or graduated from college | Over 29 | 1 |
| Age of parents at marriage: | | |
| Mean age of parents | 3 | 3 |
| Mean age of younger parent | 25.5 | 21.5 |
| Difference in parents' ages: | | |
| Mean difference in age between parents | 3 | Almost 6 |
| Marital adjustment: | | |
| Parents living together congenially | 92 | 62 |
| Contact with social agencies: | | |
| No contacts with agencies | 8 | 13 |
| Broken homes: | | |
| By death of one parent | 19 | |
| By divorce | 2 | |
| By death of one or both parents | | 27 |
| By desertion, separation or divorce | | 19 |
| By criminality of one or both parents | | 20 |
| Size of families: | | |
| Large family (5 or more children) | 11 | 58 |
| Mean number of children per family | 2.93 | 4.98 |

of a group of juvenile delinquents was presented and the second by Thom and Johnston,² in which the social background of a group of well-adjusted adolescents was studied—indicate at least the importance of environment and the contribution that it makes to the development of habits, attitudes and personality traits, and other indefinable mental and emotional characteristics that tend to produce stable, conforming, happy, efficient and mature adults, on the one hand, or asocial, non-conforming, law evading delinquents, on the other.

Striking as these statistics are, one should not jump to the conclusion that bad neighborhoods, poverty, broken homes, alcoholic fathers and psychopathic mothers are necessarily the cause of criminal careers in all the Gluecks' cases, or that the preponderance of good homes, sober industrious parents and happy marital situations necessarily produces well-adjusted children. There would be too many exceptions to such a rule to allow any but the most glib to be satisfied with such an answer. Nevertheless, it cannot be ignored that when certain types of children are subjected to these contaminated social situations, it is just as natural and normal for them to turn toward delinquent careers as it is for them to

learn to speak English when brought up in an English speaking home.

I was much impressed by the statement by Partridge,³ of the Boy Scouts of America, which reads as follows:

In the great majority of cases young people are measured against an adult scale which is quite foreign to them and not in keeping with the set of values they are maintaining with their immediate associates. The fact that they are more disposed to follow the edicts of their fellows than respond to the intangible will of the law, is not difficult to understand because of the definition they have accepted of themselves. It is very important that the individual maintain this with his own immediate group. A happy adjustment to their associates is of relatively greater importance than the possibility that they will be punished by adult society. As a matter of fact, it is not uncommon for groups of young people to consider it an honor among themselves to come into open conflict with the law. The nature of the law is painted to them as a force which is against their own interests—it chases them off the streets—it makes them go to school—it punishes them when they are caught. Keeping in good with their gang and still not getting caught comes to be a game, and those who are the most successful in playing it become the heroes of the group.

And thus it is that young people come into delinquent acts in the most moral and natural way that can be imagined. It is not as if they deliberately planned to run adverse to society. Young people usually get into trouble in the pursuit of natural impulses arising from their own biological needs. In following the traditions of their own group, young people carry on until certain numbers of them are caught up in difficulties. The great majority outgrow these tendencies; those who do not become our chronic delinquents. Many would outgrow their difficulties if given half a chance. Some are definitely started on a career of crime by the way in which they are treated when they get into minor trouble.

Psychiatry as a branch of medicine is concerned with mental aberrations, whether they be emotional or intellectual, not only those which prevent the individual from making the necessary adjustments to life so that he can conform in a satisfactory way to his environment and live in harmony with the group, but also those emotional states which create internal conflict and interfere with the individual's happiness and efficiency.

Mental hygiene is the preventive aspect of psychiatry, and is concerned with the development and preservation of mental health. Mental health is a state of mind which permits the individual to approach his maximum efficiency and to attain the greatest amount of happiness out of life with a minimum amount of friction, anxiety and guilt.

The administration of the principles underlying mental hygiene need not necessarily be confined to the realm of the psychiatrist, any more than physical hygiene needs to be administered exclusively by a physician. In fact, I believe that until men

tal hygiene can be reduced to such terms that it can be utilized in the everyday practice of the parent, teacher, nurse, physician, probation officer and others concerned with the training and education of children, it will not serve a very useful purpose or affect advantageously an appreciable portion of the general public. Such a concept of mental hygiene in no way relegates the psychiatrist to obscurity. There are a sufficient number of intricate, involved, complex problems in the field of delinquency that cannot be interpreted in terms of the individual's environment where the case-work method of the sociological school fails to fathom the depth of the inner strivings, frustrations and phantasies, and the morbid, distorted, twisted operations of a sick mind.

If delinquency is to be prevented, the attack must be made at its source, during the predelinquent stage, when character is in the process of development. During childhood the habits, attitudes, personality traits, opinions, beliefs, concepts of right and wrong, sense of responsibility and feeling of obligation to those other than self are being incorporated in the fabric of the individual's personality. The first decade, particularly the preschool years, is by far the most important in this respect. There can be no substitute for home training, not even in the school or church, much less the psychiatric clinics and juvenile courts. Probation and all the other valuable and influential agencies which have resulted in our new philosophy toward delinquency are but aids after the individual has failed to attain his place and adapt himself to the demands of his environment.

There is no doubt that in an effort to prevent or perhaps minimize the effect of these adverse sociological factors, mental hygiene and the application of psychiatric principles have a contribution to make. Frequently the underlying motivating forces, such as inferiority feelings, resentment toward authority, rebellion against dependence and such unhealthy emotions as jealousy, cruelty, pugnacity, revenge, which are subsequently manifested toward society, were originally unconsciously cultivated toward and because of individual circumstances and conditions operating during the early years. The psychiatrist working directly with the individual may so reorient his point of view, as well as that of the adults who play a vital role in his experience, that the sociological readjustments brought about by the case worker will be acceptable. This psychological approach of preparing the child for accepting new habits and attitudes toward the improved social conditions under which he may be permitted to live need not necessarily be turned over to a psychia-

trist or a clinic. As stated before, these principles must be reduced to such terms as can be practiced by all those who are exerting an influence in the development of the child.

To psychiatry and other allied groups belong those cases of delinquency resulting from biological defects and acquired handicaps of a physical or mental nature, where wise and practical therapy for the delinquent and protection to society depend almost entirely on making the correct diagnosis. Therapy as indicated in these cases must be carried out in co-operation with parents, teachers, social workers, juvenile court judges and probation officers, and not infrequently under the medical direction and occupational supervision that can be rendered only in a well-organized institution.

More strictly confined to the field of psychiatry are those delinquents whose asocial activities result from mental aberrations due to psychological causes. Delinquent or nonconforming behavior is not so different from conforming behavior psychologically as it is socially. All behavior represents an effort on the part of the individual to find satisfactory outlets for a varied sort of ill-defined emotional drives—desires, appetites, urges, call them what you will. When inherent limitations, social conditions, economic deprivations and excesses of mental stress and physical strain have imposed restrictions and subjected the individual to failure that is as inevitable as it is continuous, the usual socially approved adaptations to life break down, and conflicts, frustrations, repressions, fears, obsessions and resentments begin to dominate the individual, affect his behavior and create an unhealthy, distorted outlook on life. When these psychologically and sociologically induced forces create a situation which the individual can no longer cope with in a normal, rational way, something happens. It may be a convulsive explosion, a hysterical paralysis, or a more elaborately developed neurosis with many incapacitating and protective symptoms (all physical expressions of mental conflict), or perhaps these conflicts may express themselves in abnormal conduct of which delinquency may be a manifestation.

It is especially in the study and investigation of these peculiar, apparently unreasonable expressions of mental conflict that psychiatry has a contribution to make. Psychiatry is not a panacea in the treatment of delinquency. There is ample evidence of the limitations which our lack of knowledge regarding human nature has imposed. Psychiatry has, however, during the last two decades evolved an approach to the study of delinquency comparable to that utilized in the field of general medicine. Psychiatry is primarily concerned with

the delinquent rather than with his delinquency. It shares with medicine the scientific point of view that leads to the search for the cause rather than being preoccupied with the symptoms.

The early stages in the development of a delinquent career are as well marked as they are in the development of a disease process. It is regrettable, however, that we have not a few of the instruments of fine precision to measure and evaluate our findings in dealing with human conduct as we have in physical research. There is no sharp line separating the psychological from the sociological approach in the study of delinquency and its prevention.

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REPORT ON MEDICAL PROGRESS

THE VITAMINS*

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IN TWO previous reviews^{1,2} appearing in this series, an attempt was made to give a brief summary of present-day knowledge regarding the vitamins. This field is developing with such rapidity at the present time that what was written a year ago is already behind the times in several respects. The following supplementary review has therefore been prepared to bring the previous summary up to date.

VITAMIN A

Interest in vitamin A deficiency continues to center in the important subject of nutritional night blindness. The problem of measuring correctly the degree of subnormal adaptation to darkness is still the subject of extensive research. So far there is no general agreement as to the best procedure and the type of instrument most suitable for this purpose. Critical reviews of the difficulties involved will be found elsewhere.^{3,4} Until the method is standardized and the correct interpretation of the readings is more clearly defined, it would seem inadvisable to adopt such procedures as an aid to the routine diagnosis of nutritional deficiency. For the same reason it is probably wise at present to withhold judgment on the significance of reports based on such procedures concerning the incidence of nutritional night blindness in the community.

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THE VITAMIN B COMPLEX

Riboflavin Deficiency

In last year's review² on the water soluble vitamins, reference was made to the fact that although at that time riboflavin deficiency had not been recognized in man, nevertheless riboflavin was probably important in human nutrition, because it had been shown to be the active component ("prosthetic group") of Warburg's yellow enzyme, which apparently plays an extremely important role in the oxidative mechanisms of the tissues. Since the publication of that review clinical evidence of riboflavin deficiency has been obtained.⁵ Eighteen women were fed for a long period on a deficient diet essentially similar to that which is taken by the inhabitants of districts where pellagra is endemic. Thirteen of these women developed characteristic lesions of the mouth and face. The lesions did not respond to nicotinic acid therapy but were cured by the administration of pure synthetic riboflavin. The nature of these lesions is threefold. There is maceration and fissuring at the angles of the mouth, a type of lesion formerly referred to as perleche or angular stomatitis. The mucous membrane at the line of closure of the lips is red and denuded, the name "cheilosis" has been proposed for this lesion. Finally, there is a scaly greasy desquamation in the nasolabial folds, on the alae nasi, in the vestibule of the nose and sometimes on the ears and eyelids. Angular stomatitis had been previously recognized in many parts of the world as a man-

ifestation of deficiency disease. It is commonly present in pellagra and in Oriental beriberi,⁶ and has also been described as occurring in the absence of other evidence of vitamin B complex deficiency. That it occurs in association with deficiency of the vitamin B₂ or heat-stable fraction of the complex had been recognized previously.^{7,8} Further work will have to determine whether these lesions can always be accepted as evidence of riboflavin deficiency. It may turn out eventually that they are merely a nonspecific manifestation of poor nutrition, though readily curable by one particular nutritional factor when lack of this factor is the principal deficiency present.

Though riboflavin has been isolated and synthesized as a yellow crystalline powder, with the formula $C_{17}H_{20}N_4O_6$, it is still an expensive product. For this reason, and also because of their possible non-specificity, perlèche and cheilosis should be treated not with pure riboflavin but with yeast or crude liver extract, which are good sources of riboflavin, and at the same time contain other nutritional factors which may be of value in the particular case concerned.

Vitamin B (Complex) Deficiency

In recent years it has come to be realized with increasing clarity that the syndromes known as beriberi and pellagra are not the result of deficiency of a single dietary factor, but are the clinical consequence of multiple deficiencies involving several components of the vitamin B complex, and sometimes other dietary factors in addition. Moreover, although the classic syndromes of pellagra and beriberi are rarely encountered except in those parts of the world where they are endemic, some of the features of both these syndromes occur, with much more frequency than was formerly realized, in cases seen in other communities.

Deficiency of the vitamin B complex is liable to arise not only from faulty diet but also from defective absorption and from an increase in the nutritional needs of the body. This deficiency therefore is sometimes encountered in patients who can afford an ample and varied diet. In alcohol addicts, for instance, a polyneuritis of nutritional origin may occur, which though often mainly the result of poor eating habits is partly due to the fact that certain components of the vitamin B complex are utilized with unusual rapidity when the caloric consumption (in the form of alcohol) is abnormally high. A similar polyneuritis may occur in pregnancy, often partly as a result of loss of food by repeated vomiting, but also because of the increased nutritional requirements of pregnancy. Defective intestinal absorption is proba-

bly the principal factor in the production of polyneuritis occurring in patients suffering from organic lesions of the gastrointestinal tract. In these various conditions the type of polyneuritis is in every way similar to the polyneuritis of beriberi, and almost certainly has the same fundamental etiology.

The principal clinical manifestations of vitamin B deficiency are enumerated below.

Pellagrous dermatitis. This is mainly due to nicotinic acid deficiency, but, as it occurs on the face, may partly result from riboflavin deficiency (see above). Occasionally another type of dermatitis, due to vitamin A deficiency,^{6,9} may occur in association with vitamin B deficiency, particularly in beriberi.⁶ This is manifested by the presence of hyperkeratotic plugs in the sweat glands, dry skin and absence of sweating. It has been recently claimed¹⁰ that hyperkeratosis of the skin follicles around the nose is due to riboflavin deficiency but this seems doubtful.

Angular stomatitis. This is frequent in many deficiency states. Its relation to riboflavin deficiency has already been discussed.

Glossitis. In endemic pellagra, this is the result of nicotinic acid deficiency, but it is due to other causes in some other nutritional disorders.

Diarrhea and perianal inflammation. This occurs in pellagra, owing to nicotinic acid deficiency.

Polyneuritis. This is frequent in beriberi, pellagra and other nutritional disorders, it is commonly thought to be due to thiamin (vitamin B₁) deficiency.

Degenerative changes in the spinal cord. These occur in severe pellagra and beriberi, they are perhaps due to deficiency of the undefined factor whose deficiency is also responsible for combined system disease associated with pernicious anemia.

Psychosis. This is frequent in pellagra and occasionally occurs in beriberi.⁶ Acute psychosis associated with vitamin B deficiency usually responds dramatically to nicotinic acid therapy. Long-standing pellagrous dementia responds less well and Korsakoff's psychosis probably not at all, indicating the operation of some other factor or the development of irreversible structural changes.

Cardiovascular changes. These include tachycardia, cardiac dilatation, peripheral vasodilatation, edema and tendency to fatal syncope, they are common in beriberi and are probably a direct result of thiamin deficiency, although coexistent protein deficiency and consequent hypoproteinemia may sometimes play a part in the production of edema.

Anemia. This is sometimes severe in deficiency disease in the tropics, and is common in deficiency

associated with alcoholism, it is due to deficiency of some as yet unidentified nutritional factor, possibly identical with the dietary factor, which if not acted on by the intrinsic factor of the stomach leads to pernicious anemia. Anemia occurring in cases of vitamin B deficiency may be due also to other causes.

Porphyria It has been repeatedly stated recently that porphyria is a characteristic feature of pellagra. However, it has been shown^{11, 12} that the test for porphyrin employed in the work on which these statements are based is not a test for porphyrin. It has not yet been proved that porphyria can be caused by pellagra. It does occur in cases of pellagra associated with alcoholism and liver disease, and in such cases is quite probably due to the liver disorder.

Each of the foregoing manifestations is liable to occur in association with one or more of the others in any particular case of vitamin B deficiency, depending on which factors in the complex are chiefly lacking from the diet. The fact that endemic pellagra and beriberi usually present a clear-cut clinical syndrome is probably due to the uniformity of the diet in the locations where they occur. Elsewhere the clinical picture is far more diverse, coincident with a greater variety in the composition of inadequate diets. The multiple causation of the clinical features in most cases of vitamin B deficiency renders it particularly important to treat such cases with some preparation which will supply all the various elements in the complex. Yeast concentrates and crude liver extract are particularly suitable for this purpose. A complete, high caloric diet is also necessary to supply other important dietary essentials which, though usually not sufficiently lacking to produce any definite manifestations, are very frequently taken in insufficient amounts by subjects showing evidence of vitamin B deficiency. The pure synthetic vitamins now available should be considered only as a useful addition to this treatment, for employment in cases where evidence of deficiency of one particular factor is outstanding.

Therapeutic Use of Nicotinic Acid

The conclusions reached last year³ concerning the use of nicotinic acid in the treatment of the outstanding features of pellagra have been confirmed in most respects by subsequent work. The original optimistic report¹³ of its use in the cure of the psychotic symptoms has been somewhat revised. It is now admitted¹⁴ that some cases with long standing mental symptoms respond only partially to nicotinic acid therapy. As pointed out above, some part of the dermatitis in pellagra

may be due to riboflavin and vitamin A deficiency, and therefore will not be affected by nicotinic acid therapy. A report¹⁵ based on a careful study of the use of nicotinic acid in the treatment of pellagra indicates that 200 to 300 mg per day taken by mouth is a suitable therapeutic dose. The opinion of one experienced observer¹⁶ concerning the use of nicotinic acid is "enthusiastic, but not quite as enthusiastic as are many others about the value of the drug."

The Therapeutic Use of Thiamin

Despite the numerous statements in the recent literature that nutritional polyneuritis is due to deficiency of thiamin, I still believe that the evidence on which these statements are founded is not sufficient to justify the treatment of an uncomplicated case of nutritional polyneuritis with thiamin only. Although additional thiamin may be beneficial, adequate treatment should include an ample and nutritious diet, together with some preparation of yeast or crude liver extract.

ASCORBIC ACID (VITAMIN C)

There is little new knowledge concerning vitamin C. The successful use of an injectable form of the vitamin has been reported.¹⁷ An excellent review of present-day knowledge regarding the diagnosis of vitamin C deficiency and the therapeutic use of ascorbic acid will be found elsewhere.¹⁸

VITAMIN D

Dihydroxycholesterol (A.T. 10) has been successfully used in the treatment of hypoparathyroidism. This substance is very closely related chemically to vitamin D and has some of the same biological properties. It facilitates the absorption of calcium from the intestines, but has a more marked effect than does vitamin D in increasing the urinary excretion of phosphorus, which is probably the reason why it is not effective in rickets.¹⁹ These properties make it peculiarly suitable for the treatment of hypoparathyroidism. It has been pointed out²⁰ that a patient with hypoparathyroidism may take A.T. 10 in much the same way as insulin is taken by patients with diabetes, the dose being controlled by a simple test for calcium in the urine.

VITAMIN K

Knowledge concerning vitamin K has advanced with extraordinary rapidity during the last year. This knowledge is certainly the most outstanding achievement of nutritional science since the discovery of the pellagra preventing activity of nic

otinic acid two years ago. No attempt can be made here to review all the recent literature on vitamin K. The following account is confined to a brief summary of the present status of this vitamin. For a more complete account the reader is referred to two very helpful reviews^{21, 22} which have appeared during the last year.

Chemistry

Following the successful isolation of vitamin K by several independent groups of workers,²³⁻²⁶ recognition of its chemical composition soon followed. It was found to be related chemically to the substance phthiocol, which had been previously isolated from tubercle bacilli²⁸ and has now been shown to possess vitamin K activity.²⁷ As in the case of vitamin D, it is realized that vitamin K is not a single chemical entity, and that several closely related compounds possess vitamin K activity. They are all related chemically to naphthoquinone. Natural vitamin K₁ obtained from alfalfa has a slightly different chemical composition than has vitamin K₂ isolated from putrefied fish meal.²⁸ Vitamin K₁ has now been synthesized.^{29, 30} At the present time it appears³¹ that 2-methyl-1, 4-naphthoquinone is the most active of the synthetic compounds so far studied. The relative simplicity of these active synthetic compounds should enable them to be manufactured on a considerable scale, and before long they will doubtless be freely available for general use.

Physiology

Vitamin K was first recognized in 1935 from the fact that chickens fed on a diet deficient in this vitamin developed hemorrhages. The bleeding was apparently due to a fall in the concentration of prothrombin in the blood. According to the Howell theory of blood coagulation, prothrombin is the substance which in the presence of calcium and thromboplastin yields the active substance thrombin. Thrombin then converts fibrinogen to fibrin, thus bringing about coagulation. It is now believed that vitamin K is essential for the normal synthesis of prothrombin in the body, and perhaps is actually the active component (or "prosthetic group") of this substance. Apparently the liver plays a very important part in this synthesis.³² Vitamin K, like other fat-soluble substances, requires the presence of bile salts to facilitate its absorption from the intestinal tract.³³ It is probably present in many common foodstuffs. The vitamin is produced by other bacteria besides the tubercle bacillus, including those present in the intestines, and these may provide an important source of the vitamin.

Human Pathology

Vitamin K deficiency and consequent hypoprothrombinemia may result from inadequate intake or from defective intestinal absorption. In addition, hypoprothrombinemia may occur as a result of failure of the liver to utilize vitamin K in the synthesis of prothrombin.

Inadequate intake It has been shown³⁴ very recently that adult individuals partaking of an inadequate diet may show a reduced concentration of prothrombin in the blood, and that the administration of vitamin K will correct this abnormality. It has also been shown that in newborn infants,^{35, 36} and perhaps particularly in premature infants,³⁷ there may be a similar reduction in the level of prothrombin in the blood which usually responds to the administration of vitamin K. It has been suggested that this deficiency is due at least in part to delay in establishing in the bowel the normal bacterial flora which is able to synthesize the vitamin.³⁸ This discovery is obviously of the greatest importance in relation to hemorrhagic phenomena in the newborn, and it seems likely that administration of vitamin K to the mother prior to delivery might materially lessen the incidence of intracranial bleeding and other types of hemorrhage in the newborn.³⁷

Defective absorption In the absence of an adequate secretion of bile, vitamin K absorption is impaired and hypoprothrombinemia is liable to result. It now appears³⁹ that this is the explanation of the bleeding that occurs in cases of obstructive jaundice, and that has been responsible in the past for nearly a fifth of the operative deaths in the surgical treatment of patients with jaundice. It has been clearly demonstrated by several groups of workers⁴⁰⁻⁴² that in most cases of obstructive jaundice with bleeding tendency, the oral administration of vitamin K together with bile salts is effective in increasing the prothrombin level in the blood and in checking the hemorrhage. Vitamin K deficiency conditioned by defective intestinal absorption may also occur as a result of intestinal obstruction, surgical short circuits and certain disorders associated with diarrhea, such as ulcerative colitis and sprue.⁴³

Defective prothrombin synthesis It appears that in certain primary diseases of the liver the synthesis of prothrombin may be impaired, despite an adequate intake of vitamin K. In these conditions administration of vitamin K is less likely to be successful in raising the prothrombin level of the blood and preventing hemorrhage.⁴⁰

Diagnosis

At the present time there is no method of meas-

uring directly the amount of prothrombin in the blood, but an indication of this amount can be obtained by measuring in the test tube the time taken for the blood or plasma to clot, after precautions have been taken to see that all other substances necessary for clotting are present in excess and that the amount of prothrombin is therefore the only limiting factor. In practice the method of Quick⁴⁴ appears to be the most convenient and reliable for ordinary clinical purposes. The only practical difficulty in the use of such tests as a routine laboratory procedure is that of obtaining a satisfactory source of thromboplastin to ensure an adequate concentration of this substance in the material to be tested. It is probable however, that before long some stable preparation of thromboplastin will be found. The method will then become a simple matter that can be carried out in any routine laboratory. One difficulty in interpreting the significance of prothrombin times is that the time does not become significantly prolonged until the level of prothrombin in the blood has fallen considerably, perhaps almost reaching the point at which hemorrhagic phenomena are liable to appear. For this reason the demonstration of a normal prothrombin time in a case of jaundice prior to surgical operation is no guarantee against a dangerously low level of prothrombin in the blood, and is certainly no insurance against postoperative hemorrhage. Lesser degrees of hypoprothrombinemia can be demonstrated if necessary by diluting the plasma with additional plasma rendered free from prothrombin⁴⁵ the consequent reduction in prothrombin concentration may demonstrate a deficiency of prothrombin in specimens which, undiluted, show a normal prothrombin time.

Treatment

At the present time the indications for the administration of vitamin K as a prophylactic measure appear to be as follows. It should be given to expectant mothers shortly before delivery. Its use is indicated in cases of intestinal obstruction surgical short circuits of the intestines and conditions associated with chronic diarrhea. It is worthy of trial in chronic liver disease, but is particularly valuable in the preoperative and postoperative treatment of cases with obstruction of the common bile duct.

Vitamin K is of the greatest value in the treatment of hemorrhagic disease of the newborn, and in bleeding associated with obstructive jaundice. It will probably be found effective in cases of bleeding associated with disorders of the alimentary tract when ascorbic acid deficiency is not the

cause. It should be tried in bleeding associated with primary diseases of the liver. It is almost certainly not effective in hemorrhagic conditions such as hemophilia and purpura hemorrhagica.

Methods of Administration and Dosage

Oral administration is usually effective. In cases where the secretion of bile is impaired, bile salts in capsules (2 to 4 gm.) should be given together with the vitamin. When the bleeding is severe and the condition urgent, administration by duodenal tube has been recommended.⁴⁶ Some preparations of vitamin K can also be given parenterally the efficacy of this route of administration is at present undergoing trial.

No recommendation as to dosage will be made in this review, since the advent of synthetic vitamin K has rendered obsolete all previous reference to doses in terms of arbitrary standard units. Units defined in terms of pure synthetic vitamin will probably be adopted very shortly, and until that time the reader will find adequate recommendations elsewhere² as to appropriate doses in terms of the units at present employed.

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**CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITAL**ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor***CASE 26081****PRESENTATION OF CASE**

A fifty five year-old Italian woman was admitted to the hospital complaining of pain in the right flank.

Two years before admission the patient developed polydipsia and polyuria, and a diagnosis of diabetes mellitus was made in an outside dispensary. Since that time a daughter had tested her mother's urine at least twice a week, and had given her insulin according to the test. Further information regarding the diabetes was not obtainable.

The patient was allegedly well until seven days before entry when she noticed a "ticking" sensation about the urethral meatus during urination, associated with frequency and nocturia. Four days before admission she developed a constant steady pain, located in the right flank and right costovertebral area, which occasionally radiated downward into the right groin, this aching discomfort persisted until admission. She also developed a slight nonproductive hacking cough, which at times made her flank pain more severe. No chills, fever or other genitourinary, cardio-respiratory or neuromuscular symptoms were noted. The patient had been pregnant twenty seven times. Eight children had died in infancy, and there had been ten miscarriages. The menopause had occurred four years before admission. The remaining family, marital and past histories were negative.

The physical examination revealed a corpulent, flushed woman who lay flat in bed, moaning and groaning. Her respirations were rapid and shallow. Examination of the heart, lungs, abdomen and extremities was negative. There was an erythematous moist rash about the pubic region. The pelvic and rectal examinations were negative. The blood pressure was 110 systolic, 70 diastolic.

The temperature was 102.4°F., the pulse 90, and the respirations 32.

Examination of the blood showed a red-cell count of 5,050,000 with 85 per cent hemoglobin, a white-cell count of 15,400 with 84 per cent polymorphonuclears, and a normal smear. The urine was slightly turbid and had a pH of 5, a specific gravity of 1.020 and a ++ albumin test, in the sugar test it was green with a yellow sedi-

ment, acetone and diacetic acid were absent. The sediment was negative for red cells, but contained innumerable clumps of white blood cells and a few coarse granular casts. Abundant colon bacilli were cultured from the specimen. The stools were brown, soft, formed and guaiac negative. The blood Hinton test was negative. The admission blood sugar was 640 mg per 100 cc., the carbon-dioxide combining power 24 cc. N/10 carbonic acid, and the nonprotein nitrogen 63 mg. A blood culture showed no growth. Serum Widal and undulant fever agglutination tests were negative.

Roentgenograms of the lumbar spine and pelvis showed lipping along the articular margins consistent with a moderate degree of hypertrophic arthritis. The large bowel contained a moderate amount of gas and fecal material. No grossly dilated intestinal loops were visible. Films of the chest showed that the diaphragms and lower lung fields were obscured by large breasts. The lung fields were clear so far as they were shown on the films. Maximum x-ray exposure did not succeed in outlining the bases. The heart was within the upper limits of normal. Retrograde pyelograms showed a normal kidney pelvis and ureter on the left side. The greater portion of the right kidney pelvis was filled and appeared normal.

The patient remained in the hospital twenty nine days, during which time, for the first two weeks, she ran a constantly elevated but spiking fever, ranging daily from 101 to 102.6°F. The pulse varied similarly from 90 to 120, and the respirations were elevated between 30 and 45. For the last two weeks the temperature spiked more widely, and gradually rose to 105°F. before her demise, the pulse and respirations rose to 140 and 50 respectively.

She was placed on a diabetic dietary regime and was given insulin, and in three days after admission the blood sugar was 272 mg per 100 cc. It was maintained around this figure for the remainder of her illness, on one occasion, two weeks after entry, it was 155 mg. She was maintained thus on approximately 30 units of insulin a day. The urine sugar tests were green with sediment or blue, and the diacetic and acetone tests were all negative.

Because of the patient's urinary infection, sulfanilamide was administered to a blood level of 6.6 mg per 100 cc. on the eighth hospital day. The red-cell count on the tenth day was 3,170,000 with 62 per cent hemoglobin, and the white-cell count 18,000. The patient failed to respond, the urine continued to show abundant colon bacilli, and the pyrexia persisted. On the eleventh day the sulfanilamide blood level was 9.5 mg per 100 cc. On the thirteenth hospital day the red-cell count had

fallen to 2,700,000, and the leukocytes were 11,400. Sulfapyridine was substituted for sulfanilamide for the next four days. On the fourteenth day the patient received a 500-cc transfusion, and during the next fourteen days three similar transfusions were administered. From the eighteenth to the twenty-seventh hospital day sulfanilamide was again given to the patient, 10 gm four times a day. The red-cell and white-cell counts fell slowly and steadily, in spite of transfusions, to 2,490,000 and 7300 respectively on the twenty-fourth hospital day. On the twenty-fifth day a van den Bergh was 20 mg per 100 cc, biphasic, a bromsulfalein test gave 50 per cent retention of the dye, the carbon-dioxide combining power and serum chlorides were within normal limits. On the twenty-eighth day the red cells were 1,640,000, the white cells 400. The smear showed a few lymphocytes but no granulocytes. The patient became delirious, developed Cheyne-Stokes respirations, failed and died on the next day.

DIFFERENTIAL DIAGNOSIS

DR CHARLES L. SHORT: May I see the x-ray films?

DR GEORGE W. HOLMES: I do not believe I can add anything to the description given in the text. Certainly the diaphragm is high. She was a large heavy woman, apparently, and the poor aeration could be explained the way it was in the report. There is nothing characteristic about the chest films. Those of the pelvis, taken after the retrograde injection was made, are not complete, but I do not see anything characteristic about them. I should think they would be interpreted as negative.

DR SHORT: I think we can accept the diagnosis of diabetes in this patient without question. She was undoubtedly a mild case in a middle-aged individual who had a high threshold for sugar, perhaps due in part to renal infection with diminished renal function. Further evidence that it was a mild case is the fact that she developed no acidosis in spite of the infection. During the course of the patient's illness the diabetes was well controlled, and I do not believe we can say that it bore any direct relation to her death.

We can also accept the diagnosis of urinary infection due to the colon bacillus, presumably with pyelitis and pyelonephritis. There is no evidence from the pyelograms or clinically of any urinary obstruction, but with twenty-seven pregnancies she may well have had a cystocele that contributed.

The patient was treated with sulfanilamide. That was started on the eighth hospital day and on the tenth the red-cell count was 2,000,000 lower than

on admission. It would be interesting to know what the count was the day before sulfanilamide was started—in other words, whether this was a fall over two days or whether the count had been falling steadily because of her infection. The days later there was noted a further fall in the red-cell count to below 3,000,000. At this point sulfapyridine was substituted for three days, either because of the anemia the patient was developing or possibly because the infection was not being controlled by the sulfanilamide. From that time on the patient was given sulfanilamide until ten days before her death. She had four transfusions but the red-cell count remained level for a while and finally fell off still more. Then she developed jaundice, with a positive van den Bergh test, and died with a red-cell count of 1,600,000 and agranulocytosis.

The question that must be decided at the outset is whether the anemia or agranulocytosis could have been due to anything besides drug toxicity. I think we must assume that the blood changes were due to the sulfanilamide and sulfapyridine rather than to the infection, but of course in a patient with severe infection and receiving sulfanilamide that point cannot be definitely settled at a mortem. The jaundice I should rather ascribe to the hemolytic type of anemia that characteristic occurs after sulfanilamide than to any form of liver damage secondary to the infection. A depressed liver function is observed in cases of severe hemolytic anemia associated with sulfanilamide, probably due to anoxia of the liver cells. The diphasic van den Bergh is also compatible with a hemolytic anemia and does not predict primary liver damage. It would be helpful to know what the blood smears showed during the course of the disease—as to whether there was any reticulocytosis or other evidence of regeneration, also, whether there was urobilinogen in the urine.

The continued fever toward the end may well have been due to drug toxicity rather than to the original infection, but there is no way of proving that, and it is often a difficult decision to make in a patient who is receiving sulfanilamide. An aplastic form of anemia does rarely occur with sulfanilamide and that is a possibility here, since we do not know whether the blood smears showed aplasia or regeneration, but it certainly is very uncommon, the hemolytic type of anemia being much more frequent.

What would be the autopsy findings which would prove whether my ideas are correct? I think that, if the patient died from a hemolytic anemia due to sulfanilamide, we should find a

hyperplastic bone marrow so far as the red-cell series is concerned and, in addition, evidence of arrested maturation of the white-cell series. This is usually found in cases of agranulocytosis due to drugs, and from the few cases that have been autopsied, sulfanilamide is no exception. In other words, the bone marrow will not show a complete depression of the white-cell series but only an arrested maturation, with mostly blast cells. In addition, the hemolytic nature of the anemia should be evidenced by the deposition of iron-containing pigment in the reticuloendothelial system in the liver and spleen. That would be my explanation as to the cause of her death—that it was largely due to toxicity from sulfanilamide rather than primarily to the urinary infection or to the diabetes.

DR. MAURICE FREMONT SMITH I am interested in the low liver function. Do you usually get that with secondary anemia from any cause?

DR. TRACEY B. MALLORY Not so low as that.

DR. SHORT Low liver function has been reported in cases of severe hemolytic anemia due to sulfanilamide.

DR. WYMAN RICHARDSON I predict that some day we shall see toxic hepatitis from sulfanilamide.

DR. SHORT Toxic hepatitis has been described as due to sulfanilamide, but in this case I should think it was bringing in an extra factor that is not necessary.

CLINICAL DIAGNOSES

Toxic hepatitis.
Diabetes mellitus.
Bacillus coli pyelitis.
Agranulocytosis.

DR. SHORT'S DIAGNOSES

Pyelonephritis.
Hemolytic anemia.
Agranulocytosis.
Diabetes mellitus.

ANATOMICAL DIAGNOSES

Chronic pyelonephritis, bilateral.
Perinephric abscess, right.
Cystitis, acute hemorrhagic.
Obesity.
Agranulocytosis.
Erythropoietic hyperplasia.

PATHOLOGICAL DISCUSSION

DR. MALLORY The autopsy on this woman showed that there was an extremely severe bilateral pyelonephritis with multiple abscesses scattered throughout both kidneys, and on the right side one of these had perforated the capsule and

a perinephritic abscess had developed anterior to the kidney, lying between the adrenal gland and the second portion of the duodenum. It was a rather extensive pencil-like tract, which was not very wide at any point. There was nothing in the clinical history that suggested it at all. I do not believe that anyone could have localized it or drained it.

The other finding of major interest was the condition of the bone marrow. That showed a definite hyperplasia of the red-cell series, which had extended even into the long bones. The marrow in the central part of the femur was quite markedly erythrogenic. There were a moderate number of undifferentiated cells, but most of them appeared to belong to the red-cell series, so far as we could identify them. The white-cell elements appeared to be completely and specifically eliminated. Megakaryocytes were present in normal numbers, and a moderate number of plasma cells were found. Whether on that basis we can decide that this agranulocytosis was or was not due to sulfanilamide, as Dr. Short suggests, I am uncertain, but my inclination is to believe that it primarily was.

DR. JAMES H. THORNDIKE Did she have a fatal lesion in the kidneys?

DR. MALLORY Yes, I think there is not the slightest doubt that she would have died of renal sepsis.

DR. EUGENE S. SULLIVAN Do you remember whether the abscesses in the kidneys showed polymorphonuclears?

DR. MALLORY None whatever. Cultures from them showed *Bacillus coli* and nonhemolytic streptococci.

DR. RICHARDSON How about the liver?

DR. MALLORY It showed essentially nothing. There was a good deal of hemosiderin in the bone marrow and spleen.

DR. SHORT What is the possibility that there were blasts completely undifferentiated, but be- longing to the white-cell series, in the bone marrow?

DR. MALLORY The total cellularity of the bone marrow was about half normal, and the half that you could identify appeared to be wholly of the red-cell series.

DR. SHORT Has that been your observation in the cases of agranulocytosis—arrested maturation rather than aplasia of the white-cell series?

DR. MALLORY Usually, but I am sure I have seen both types of reaction.

I do not believe the autopsy findings can be considered conclusive one way or the other. I certainly do not believe that I can exclude the possibility that the agranulocytosis was due to the

sulfanilamide. On the other hand the amount of renal sepsis was, I am sure, enough to have been lethal, strenuous efforts were therefore justified in the attempt to control it

CASE 26082

PRESENTATION OF CASE

A sixty-four-year-old widowed Canadian nurse entered the hospital complaining of asthma.

Approximately three weeks before entry the patient had a chest cold associated with a slight cough, more pronounced at night, with the production of white, frothy, stringy, tenacious sputum. One week later she suddenly had an attack of difficulty in getting her breath both on expiration and inspiration, although this was seemingly more marked with the latter. A physician was called, and he gave her adrenalin, which relieved her. After that she had occasional similar but less severe attacks, which were controlled by capsules left by her physician. She was also taking an expectorant cough medicine at that time. She had a severe attack one week before entry, and another on the evening before entry which was so bad that she "nearly died" and required adrenalin. She had had two attacks of asthma during her life, both very slight. The first attack, thirty years before admission, was associated with smoke from stove polish, and the other, twenty-five years before entry, was without any known cause. She had lived in the same house for two years and had had a dog for ten years. She had always noted that she felt much better when at a high altitude. For the previous seven years during the month of August she had had hay fever. This was always relieved by going to Nova Scotia. She had never had any skin lesions and was not subject to food idiosyncrasies.

There was no family history of hay fever or asthma. She had been born in Nova Scotia, and all her life had been spent either there or in Massachusetts, except for several years in California. There was no history of pneumonia or pleurisy.

Physical examination showed a well-developed and rather thin woman in no apparent distress. The chest showed slight hyperresonance and was clear except for occasional diffuse squeaks and groans. The heart was not enlarged, the sounds were not remarkable. No murmurs were heard. There was slight accentuation of the apical first sound. The blood pressure was 165 systolic, 80 diastolic. The peripheral arteries were firm.

The temperature was 98°F, the pulse 82, and the respirations 22.

Examination of the urine was negative. The

blood showed a red-cell count of 6,180,000, a hemoglobin of 80 per cent, and a white-cell of 10,300 with 60 per cent polymorphonuclear cells, 28 per cent lymphocytes, 8 per cent monocytes and 4 per cent eosinophils. The sputum was and mucoid and contained a few cocci in blood. The stools were negative.

X-ray films of the chest showed diffuse clearing of the lung markings, without any consolidation. The diaphragm was low in position and limited in excursion. A sinus showed diffuse thickening of the lining membrane of all sinuses, with obliteration of the cavities of the right ethmoids.

She continued to raise mucopurulent sputum. Adrenalin helped her a great deal, although the chest still had scattered sibilant rales. Intradermal tests showed a good-sized reaction to ragweed, smaller ones to grasses. The tests somewhat aggravated her asthma, but this was slowly relieved by adrenalin. During the evening of the day she had a severe asthmatic attack. Her pulse was weak and rapid, cyanosis was marked, there was no relief from adrenalin. She was put in an oxygen tent, with improvement. The extremities were cold and cyanotic. Intravenous 1 per cent glucose, containing 1 cc of adrenalin, gave no striking relief. The blood pressure fell to 70 systolic, 70 diastolic, and the pulse was 120. She rapidly failed and died the following evening.

DIFFERENTIAL DIAGNOSIS

DR MILTON H. CLIFFORD. The story on reading seems to be consistent with a perfectly clear-cut case of a woman dying in status asthmaticus, without any complicating factors. In fact, the sounds altogether too direct a story to be such a diagnosis.

Here is a woman who, so far as we know, has been perfectly healthy until the last month of her life, except that at intermittent times she had allergic manifestations—many years ago in the form of asthma, and in the last seven years in the form of hay fever—which one gathers have been severe enough to bring her to a physician. We do not know whether her present hospitalization was during the time of the hay-fever season; if so, one would, perforce, be pushed even further to the diagnosis of asthma. Moreover, an attack of asthma is not uncommonly precipitated by an upper-respiratory infection. Thus the history is entirely in favor of asthma.

The physical examination also seems to confirm this, in that it was essentially negative except for the hyperresonance of emphysema and the occasional squeaks and groans. It is to be noted, however, that when she was seen at home there were

to be even more difficulty in inspiration than in expiration, contrary to what one usually expects. The examination of the heart is reported as essentially negative, accentuation of the first sound means little, and it would be impossible to read a story of mitral stenosis into such minimal findings. There is no mention of distention of the neck veins, of engorgement of the liver or of the inability of the patient to lie flat. One assumes, however, the absence, particularly of the last observation, means that she was not having cardiac orthopnea. Further, the temperature was normal, and so far as we know, it stayed at least essentially normal throughout her stay, a fact which is against a complicating infection.

The x-ray films of the lungs give negative confirmation, particularly helping to rule out the possibility of a foreign body or of a tumor in the mediastinal region. The sinus film was quite consistent with an allergic state, presumably with thickened membranes and, along with the normal white-cell count and temperature, with no active infection. Probably a nasal examination would have shown a vasomotor rhinitis.

The most interesting of the laboratory findings is the polycythemia, which is perfectly consistent with the pseudopolycythemia seen in asthma, although whether associated with dehydration or with compensatory increase in oxygen-carrying units, particularly in view of a comparatively low hemoglobin, I do not know. The blood smear does not help us much, except that the eosinophilia of 4 per cent is consistent with, if not lower than what is often found. Again, the paucity of organisms in the sputum goes with the thick, mucoid, plugging secretion found in the asthmatic patient.

In considering other types of illness, diffuse thickening of the lung margin is suggestive of a much longer process than the story which we have, and could go with a mild degree of non-specific pulmonary fibrosis or with bronchiolitis obliterans. But a fatal degree of these would be unlikely with so short a history, at least without more suggestive evidence of a cor pulmonale and a more prolonged and febrile terminal stage. Furthermore, no mention is made of clubbed fingers to go with a chronic pulmonary condition.

A foreign body in the main bronchus is not ruled out, except that the sputum was at no time either purulent or bloody, nor were there definite areas of atelectasis. What plugging there was apparently must have been with spasm and possibly related mucous plugs. Friedländer's bacillus will cause a very thick tenacious sputum, but again the patient had no febrile course, and except for

the short terminal stage, was apparently not unduly sick.

There is one other possibility. We presume that this woman had some hypertension with a systolic pressure of 165 at entry. We also are led to the assumption that she had at least some generalized arteriosclerosis, as noted in the firmness of the radial arteries. Could it be possible that during the severe asthmatic attacks, on the tenth day, she had a coronary infarction? Certainly this can occur without pain, and with marked dyspnea. One would think, however, that such dyspnea would be out of proportion to the squeaks and groans heard in the chest. The blood pressure fell, but this could have been due to shock in any situation and not at all specifically to a coronary infarction. Cyanosis could have gone with either. One might expect varying irregularities of the heart rate or a suggestion of cardiac enlargement with an infarction. These would not be necessary, however, and no remark on the pulse, except its rapidity, is noted. I do not believe that this possibility can be either ruled in or out. An electrocardiogram might possibly have helped a great deal. The amount of peripheral shock she was in could have been present with status asthmaticus as well as with coronary infarction.

There is no mention as to whether she was given any of the opium derivatives before or during this stage of shock. To many of the asthmatic patients, particularly those with symptoms as severe as those this woman had morphine or pantopon seems to be an aggravator or instigator of even more severe asthma. Thus, even if it were known that she had a coronary occlusion unless it had been previously ascertained she was not sensitive to opium derivatives, it would not have been wise to use them.

We have repeatedly heard that patients do not die in an asthmatic attack. Several years ago Dr. Mallory told me that he had seen some 13 cases in the Massachusetts General Hospital, up to that time who had died of no other findable cause than the bronchial spasm of asthma and the lungs distended with trapped air.

My belief is that this patient died of bronchial asthma, that she had some arteriosclerosis, and by guesswork only, that she did not have any coronary infarction.

CLINICAL DIAGNOSES

Bronchial asthma
Chronic bronchitis
Emphysema.
Terminal pneumonia

DR CLIFFORD'S DIAGNOSES

Status asthmaticus
Emphysema of lungs
Arteriosclerosis, general

ANATOMICAL DIAGNOSES

Bronchial asthma
Pyelitis, bilateral, moderate
Cholelithiasis
Arteriosclerosis, slight, aortic
Leiomyomas of the uterus
Pleuritis, chronic fibrous, left

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY As Dr Clifford has already intimated we have had in this hospital a considerable experience with fatal bronchial asthma. A significant number of cases die in and apparently of an asthmatic paroxysm. Other modes of death indirectly attributable to asthma are those from cor pulmonale and from emphysema or a combination of the two. It has been our experience that patients with very chronic persistent asthma of twenty or thirty years' duration rarely die in a paroxysm. Paroxysmal deaths are much more frequent in people who have

had comparatively little preceding asthma and especially in people who develop asthma for the first time in their fifties and sixties. Although this woman had had apparently two widely separated single attacks of asthma earlier in her life, it is probably fair to class her in the latter category.

At autopsy the findings were entirely typical of a paroxysmal death. Like all the other cases the bronchial tree from the first subdivision of the primary bronchi down to the respiratory bronchioles was plugged with thick tenacious mucinous casts. The alveoli were uniformly distended to the maximal inspiratory degree, but there was no anatomic fusion of alveoli or other evidence of structural emphysema. The heart, despite the systolic blood pressure reading of 165, was quite small, weighing only 225 gm. It seems doubtful, therefore, if she could have had a significant degree of hypertension, and it is possible that the blood pressure reading was taken shortly after she had received adrenalin. There was certainly no cor pulmonale, since the right ventricle measured only 2 mm in thickness. The coronary arteries were entirely negative. The only coincidental findings of any significance were a slight acute bilateral pyelitis and a stone in the gall bladder.

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THE BENZOL HAZARD

The industrial hazards of benzol have long been recognized and in recent years increasingly stringent precautions have been taken to minimize or prevent its untoward effects. Yet, from recent studies, it is distressingly apparent that the potential dangers of this chemical are not appreciated to the fullest extent and that the clinical and pathologic manifestations of benzol poisoning are by no means as simple and clear cut as they were once thought to be.

A provocative series of articles* in the *Journal of Industrial Hygiene and Toxicology* has brought to light a number of previously unsuspected facts. It has hitherto been the general consensus that

Benzene (Benzol) Poisoning: Five papers. Reprinted from the *Journal of Industrial Hygiene and Toxicology* 1939 (21:321-435 1939) 114 pp. BOSTON: Journal of Industrial Hygiene and Toxicology 1939. Bound reprints of three papers in this series, "Chronic Exposure to Benzene (Benzol). I. The Industrial Aspects. II. The Clinical Effects. IV. The Pathological Results," are available for distribution to Massachusetts physicians on application to the Division of Occupational Hygiene, Department of Labor and Industries, 23 Joy Street, Boston.

chronic benzol poisoning was characterized by the syndrome of aplastic anemia, that its earliest manifestation was a moderate or severe leukopenia and that a vapor concentration of 100 parts per million was compatible with complete safety for the workers. In view of the recent studies referred to, some if not all these dicta must be discarded.

It would appear that, in certain cases at least, vapor concentrations of less than 25 parts per million were followed by death, and the authors state that it is doubtful whether any concentration of benzol greater than zero is safe over a long period of time. It is therefore obvious that if benzol is to be used in industry, close medical supervision of all workers is of the utmost importance, and it is to be hoped that in the future an adequate substitute will be developed for this hazardous, though efficient, solvent.

Contrary to what is usually taught, the syndrome of aplastic anemia with its attendant leukopenia is not characteristic of benzol poisoning. Hunter and his associates found in their cases polycythemia and anemia, leukopenia and leukocytosis, leukemoid blood pictures and apparently even true leukemia. Regarding the last, Mallory states "The evidence that chronic exposure to benzene produces leukemia in human beings is still incomplete, but it is accumulating at a rate and to a volume which command serious consideration."

It is further stated that the clinical symptoms and signs of chronic poisoning may appear after a prolonged latent period, during which the worker may not have been exposed to the chemical and it is suggested that under certain circumstances industrial compensation must be extended to include cases of poisoning long after exposure has ceased. It is well to remember, however, that the *post hoc ergo propter hoc* argument has been and always will be uncertain and that one should not be too hasty in attributing a given hematologic disorder to an exposure to benzol some years before.

One can no longer rely on leukopenia as the earliest sign of benzol poisoning, and the bone marrow may apparently be aplastic, hyperplastic,

leukemoid or even deceptively similar to "the neoplastic processes termed Hodgkin's sarcoma"

According to Hunter's findings, benzol poisoning must be suspected whenever, in an exposed person, an eosinophilia exists, whenever the percentage of polymorphonuclear neutrophils is decreased or whenever young white blood cells are present in the peripheral blood, and the earliest diagnosis must depend on an evaluation of the complete blood picture rather than any particular hematologic feature. The diagnosis must be made, or at least suspected, before anemia develops, if a favorable outcome is to be expected.

It is clear that the former criteria for the clinical and pathological diagnosis of benzol poisoning must be revised. It would appear that a large variety of hematologic syndromes may follow exposure to benzol, even in minimal concentrations. The clinical and industrial implications of these facts are far-reaching and of the greatest importance.

A GOVERNMENTAL SYPHILIS PROJECT

A LETTER in this issue of the *Journal* calls attention to a governmental activity in the field of medicine which has been going on in Boston since 1937. The syphilis problem is large enough to demand a careful investigation from every possible angle. The best results can be obtained by the co-operation of all possible organizations in a particular region. It is quite necessary that any such survey be undertaken by individuals with adequate experience in syphilis and in the interpretation of the records of such cases. In the case of the records themselves, there are undoubtedly periods in any hospital when the records are not accurate, perhaps by reason of insufficient personnel or by reason of changes or additions to personnel, particularly that brought about by new individuals coming into the hospital for training.

Any such survey should be under the careful direction of the hospital staff in addition to the personnel of the project, because the members of the former are usually much more familiar with

the patients and problems of the clinic. Such co-operative studies of the end results of syphilis, carried on with definite assurance of proper supervision and of a satisfactory technic for developing the desired statistics, should furnish considerable information with regard to the status of syphilis in a particular community.

MEDICAL EPONYM

BASEDOW'S DISEASE

The description of exophthalmic goiter which is considered classic by the Germans is that of Karl A. von Basedow (1799-1854), a practicing physician in Merseburg. It appeared in Casper's *Wochenschrift für die gesammte Heilkunde* (197-204, 220-228, 1840). The article is entitled "Exophthalmos durch Hypertrophie des Zellgewebes in der Augenhöhle [Exophthalmos as a Result of Hypertrophy of the Cellular Tissue of the Orbit]." The translation of a portion of the article is as follows:

I have frequently observed exophthalmos caused by a diseased condition of the cellular tissue of the orbit—a peculiar hypertrophy which seemed to arise as the result of disease of the heart and the larger blood vessels of certain glandular and other tissues.

Fourteen years ago I first made the acquaintance of Mrs. G., when she was a nineteen-year-old girl. At that time she was still suffering from scrofulous glands in the neck, but was otherwise well. She had had an acute rheumatism which had left, as sequelae, edema of the ankles, loss of weight, amenorrhea, palpitation and rapid small pulse, precordial distress and dyspnea. Even at this time there was also, however, a definite protrusion of the otherwise healthy and visually normal eyeball, so that the patient slept with the eyes open, had a frightened appearance, conducted her self in a careless and lively manner, and soon had the reputation of being a little mad.

Coincident strumous swelling of the thyroid gland led me to suspect a similar intumescence of the cellular tissue behind the optic bulb and suggested the use of iodine and digitalis, whereupon an improvement in all her symptoms resulted, although she still showed an unhealthy pallor and her eyes were unnaturally wide open and prominent.

After detailing the typical symptoms of hyperthyroidism in four other cases, he concludes:

Having given it as my opinion that the immediate cause of exophthalmos is a strumous hypertrophy of the cellular retrobulbar tissue, I wish to amplify this by saying that I regard this hypertrophy as an incidental phenomenon, secondary to an abnormal condition of the circulatory system—a blood dyscrasia which, by reason of some as yet unknown scrofulous taint, takes the form of glandular growths and tissue hypertrophy.

R W B

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AND GYNECOLOGY*

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330 Dartmouth Street
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SEPSIS DEVELOPING FIVE DAYS
AFTER FORCEPS DELIVERY

Mrs. L. P., a twenty-one year-old primipara, was admitted to the hospital February 13, 1933. She was at term but not in labor, and entered because of a slight bloody show.

The family history was negative, as was the patient's previous history. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted four days. The last period had begun on May 4, 1932, and confinement was expected about February 11.

The pregnancy had been characterized by much nausea during the first trimester. The blood pressure and urine had been consistently negative, and there had been no headaches or edema.

Examination on admission showed a well developed and nourished woman. The temperature was 98.0°F., the pulse 88, the respirations 22, and the blood pressure 120 systolic, 80 diastolic. The heart sounds were clear, and the action regular, there were no murmurs. The lungs showed uniform resonance and were clear. The abdomen presented a full term pregnancy, the fetus lying in an OLA position, with the head well engaged. The pelvic measurements were within normal limits.

Rectal examination showed no dilatation of the cervix. There was a slight discharge of blood tinged mucus. Urine examination showed the slightest possible trace of albumin and no sugar. The sediment was essentially negative. A blood Wassermann test was negative.

After a twelve hour labor the patient was delivered by a mid forceps application on February 14. A right lateral episiotomy was done and repaired with No. 2 chromic catgut. The child, a boy, weighing 8 pounds, 11 ounces, was in good condition. The placenta was expressed after fifteen minutes, the uterus contracted well, and there was no undue bleeding.

The patient's temperature remained below 99.0°F until the evening of the fifth day. There was at the time a definite epidemic of streptococcal infection in the hospital, and what were believed

to be rigorous precautions were being taken to prevent its spread. On the evening of the fifth day the patient's temperature rose to 101.0°F., but the pulse was not affected. The fundus was well contracted, the lochia was not foul and the episiotomy wound appeared clean. Ice was applied to the fundus, an ampule of pituitary extract was given hypodermically, and half a teaspoonful of fluid extract of ergot was ordered to be given by mouth every four hours. The temperature continued to rise, reaching 104.0°F on the ninth day.

The white-cell count on the sixth day was 16,800. The blood sedimentation rate by Friedländer's method was ten minutes, and the hemoglobin was 65 per cent (Sahli). A blood culture taken on the ninth day showed no growth, and cultures taken on the eleventh, fifteenth and seventeenth days post partum were also negative.

The temperature remained at 104.0°F for two days and then dropped to 101. On the thirteenth day it rose to 103.0°F and continued to show a picket-type course, its highest point being 105.0 and its lowest 98.0, for seven days, after which time it dropped to normal.

On the eleventh day the sutures were removed from the episiotomy wound, a small amount of pus escaped, but the temperature was not affected. The lochia became somewhat foul on about the seventh day post partum.

Treatment was conservative. Food and fluids were forced and ice was applied intermittently to the fundus. Several courses of ergot by mouth were given. On the seventeenth day a transfusion of 250 cc. of citrated blood was given from a compatible donor. It was intended to follow this up with a series of small transfusions at intervals of a few days, but on the twentieth day the temperature dropped to normal and remained there during the rest of the patient's hospital stay.

The patient was discharged the twenty-third postpartum day. Discharge examination showed the uterus fairly well involuted, the vaults clear and the episiotomy wound clean although still granulating.

Comment. This is a case of institutional sepsis. Such cases may develop any time during the puerperium, this case showing no febrile reaction until the fifth day. Conservative treatment was followed. It is doubtful if the single transfusion had any effect on the course of the infection, although repeated small transfusions furnish one of the best ways of raising the patient's resistance. In cases of sepsis developing after three days it is presumable that the infection did not gain entrance at the time of delivery. It is possible that this infection was secondary to a throat in-

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

fection in the patient or was due to contamination following imperfect nursing care. In cases of epidemic infection all persons having anything whatever to do with the parturient patient should have throat cultures taken at least once a week and should be meticulous in the use of masks, furthermore, the care of utensils, bedpans and so forth must be scrupulous. As has been pointed out in this column before, the only way to combat institutional infection is perfect isolation, and if this cannot be obtained, closure of the institution is imperative.

DEATH

SHEA—MICHAEL I. SHEA, M.D., of Chicopee, died February 11. He was in his sixty-fifth year.

Born in Chicopee, he attended the local schools and Holy Cross College. He received his degree from Georgetown University School of Medicine in 1904 and later studied at Vienna. At the time of his death Dr. Shea was city physician and a member of the board of trustees of the Monson State Hospital. He was also chairman of the board of health and on the staff at Mercy Hospital.

Dr. Shea was a former member of the Massachusetts Medical Society.

His widow, two sons, two daughters, a brother and four sisters survive him.

MISCELLANY

GIFT FOR TUFTS

A gift of \$42,200 to the Tufts College Medical School from Dr. and Mrs. George G. Averill, of Waterville, Maine, was recently announced by President Leonard Carmichael. The fund, to be turned over to the school during the years of 1940 and 1941, will be devoted to the establishment of the Dr. and Mrs. George G. Averill Department of Anatomy in Memory of Professor Charles P. Thayer, President Carmichael said. Known as an industrialist, Dr. Averill was one of the first physicians graduated from Tufts nearly half a century ago.

The new medical school building, of which the gift will provide the entire top floor, will be situated in downtown Boston at the New England Medical Center, a location convenient to the Boston City Hospital and the other clinical teaching centers of the school, it was announced. It will be erected as soon as the entire \$750,000 needed has been obtained. Dr. Charles P. Thayer, in whose memory the gift was made, was one of the original seven founders of the school in 1893 and first head of the anatomy department.

In a statement accompanying his gift, Dr. Averill said: "The Tufts College Medical School has attained a singular position of responsibility to New England, since my graduation nearly a half-century ago these six states have come to depend more and more for their medical care and community health services on Tufts. Now the school trains more physicians for New England than any other medical school in the country. In the same period, anatomy has attained recognition as a mother science, embracing all fields of medicine, it is important that students who will be the physicians of tomorrow have the best opportunity to study a subject which has become one of the major biological sciences concerned with life processes. As

a New Englander I can think of no better investment than that which will support training at the school which is the chief source of our doctors."

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR DECEMBER, 1939

| DISEASES | DECEMBER 1939 | DECEMBER 1938 | FIVE YEAR AVERAGE* |
|--------------------------|------------------|------------------|-----------------------|
| Anterior poliomyelitis | 6 | 0 | 5 |
| Chickenpox | 1510 | 1096 | 1495 |
| Diphtheria | 20 | 23 | 36 |
| Dog bite | 577 | 561 | 515 |
| Dysentery bacillary | 26 | 14 | 7 |
| German measles | 26 | 55 | 121 |
| Gonorrhea | 335 | 400 | 517 |
| Lobar pneumonia | 396 | 415 | 447 |
| Measles | 1082 | 902 | 878 |
| Meningococcus meningitis | 1 | 5 | 8 |
| Mumps | 337 | 470 | 532 |
| Paratyphoid B fever | 2 | 6 | 2 |
| Scarlet fever | 412 | 506 | 468 |
| Syphilis | 433 | 480 | 443 |
| Tuberculosis pulmonary | 284 | 177 | 253 |
| Tuberculosis other forms | 28 | 23 | 28 |
| Typhoid fever | 5 | 3 | 8 |
| Undulant fever | 2 | 5 | 4 |
| Whooping cough | 511 | 784 | 839 |

*Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Haverhill, 1, Lynn, 1, Revere, 1, Saugus, 1, Somerset, 1, Worcester, 1, total, 6.

Diphtheria was reported from Andover, 1, Boston, 3, Chelsea, 1, Dedham, 1, Foxboro, 2, Lawrence, 4, Methuen, 2, North Andover, 1, Revere, 2, Taunton, 3, total, 20.

Dysentery, bacillary, was reported from Amherst, 1, Boston, 1, Brookline, 1, Cambridge, 3, Everett, 1, Lee, 3, Lowell, 1, Lynn, 3, Malden, 6, Medford, 3, Wrentham, 3, total, 26.

Infectious encephalitis was reported from Boston, 1, total, 1.

Malaria was reported from Boston, 1, Taunton, 3, total, 4.

Meningococcus meningitis was reported from Pittsfield, 1, total, 1.

Paratyphoid B fever was reported from Brockton, 1, Peabody, 1, total, 2.

Pellagra was reported from Gardner, 1, Haverhill, 1, total, 2.

Septic sore throat was reported from Boston, 9, Braintree, 1, Cambridge, 1, Merrimac, 2, Milton, 1, New Ashford, 6, Williamstown, 2, total, 22.

Tetanus was reported from Quincy, 1, total, 1.

Trachoma was reported from Agawam, 1, Boston, 2, Brookline, 1, total, 4.

Trichinosis was reported from Boston, 1, total, 1.

Typhoid fever was reported from Agawam, 1, Boston, 1, Erving, 1, Newbury, 1, Weymouth, 1, total, 5.

Undulant fever was reported from Gardner, 1, Wilmington, 1, total, 2.

For the first time in several months the reported incidence of diphtheria fell below that for the previous year. Lobar pneumonia was reported well within the five year average.

Bacillary dysentery, primarily of the Sonne type, continues to be prevalent, although at a lower level than for the past several months.

Scarlet fever had its lowest reported December incidence since 1918.

Dog bite had its highest reported December incidence.

Measles continued to show an increased incidence, reaching a figure above the five year average.

There was nothing unusual about the reported incidences of anterior poliomyelitis, chickenpox, meningococcus meningitis, mumps, typhoid fever, paratyphoid fever, undulant fever, tuberculosis (pulmonary) and tuberculosis (other forms).

Whooping cough and German measles were reported well within the five year averages.

NOTES

The following appointments to the staff of the Harvard Medical School have been recently announced: Hans P. Mueller, M.D., University of Königsberg, 31 of Königsberg, Germany, as assistant in roentgenology; Ping Yang Liu, M.D., Hunan-Yale Medical College, 35 of Siangtan, Hunan, China, as research fellow in bacteriology and immunology; Carey M. Peters, M.D., Harvard, 36 of Spring Valley, New York, as assistant in medicine; Elias Strauss, M.D., Columbia, 37 of Roosevelt, New York, as research fellow in medicine; Herbert Lund, M.D., University of Pennsylvania, 31 of Uniontown, Pennsylvania, as research fellow in legal medicine.

John G. Scannell, a fourth-year student at the Harvard Medical School and the son of Dr. David D. Scannell, has been awarded the Henry Asbury Christian Prize, one of the outstanding honors of the Harvard Medical School. The prize is awarded to "the student in the fourth year class who has displayed diligence and notable scholarship and offers promise for the future." The award was established in 1937 in honor of Dr. Henry A. Christian, Harvey Professor of the Theory and Practice of Physics, Emeritus, a member of the Harvard Medical School staff since 1902.

CORRESPONDENCE

SYPHILIS PROJECT

To the Editor: Project No. 17568 (Op. No. 665-14-3-93) was established by the Works Projects Administration in 1937 for the study of the problem of syphilis in Metropolitan Boston. This work has been carried on successfully at the Boston City Hospital with the co-operation of the hospital authorities and members of the staff.

Many problems relating to syphilis have been undertaken, some of which have been satisfactorily dealt with while others are at present demanding the earnest attention of clinicians assisted by skilled technical workers. An analysis of the cost of syphilis in a large general hospital was published in the November 24, 1938 issue of the *Journal*.

A tremendous amount of material relative to syphilis and its management and end results has been collected and after proper classification and evaluation, final decisions will be published.

On the basis of the findings in thousands of case records at the Boston City Hospital, research work has been done in tabes dorsalis, cerebral thrombosis and syphilitic involvement of the spinal cord. Extensive studies have been made on syphilis in pregnancy, syphilis and alcoholism, and cardiovascular syphilis. Syphilitic lesions of the eye, as described and diagnosed in case records at the Boston City Hospital have been thoroughly studied and classified as to type, etiology, serology, therapy and outcome. Thousands of records of syphilitic cases have been abstracted. These abstracts have been transcribed to small cards that will be filed for future use by members of the hospital staff.

Bibliographic records relative to important contributions by the medical profession to the subject of syphilology have been prepared and filed in a convenient and easily accessible manner for ready reference.

Due to the inadequacy of the desired number of cases at the Boston City Hospital and also because of the paucity of information pertinent to our specific interests in the records, it has been thought wise to extend the scope of the study of congenital syphilis.

A previously attempted study of the lesions in the long bones of syphilitic infants in the first six months of life has stimulated a widespread interest in the subject of congenital syphilis, and as a result it has been proposed by the heads of various hospitals in Metropolitan Boston to conduct a survey of congenital syphilis covering a period of twenty years. It is obvious that the results of a survey of such magnitude would be more truly reliable and decidedly more representative than would the results of the findings from a single hospital in any particular community.

The aims of the project in regard to the above proposal may be briefly summarized, as follows:

1. To investigate the frequency and time of appearance of changes in the long bones of congenitally syphilitic children.
2. To determine the value of modern antisyphilitic treatment in congenital syphilis.
3. To carry out a follow-up system wherever possible, on those with congenital syphilis for the purpose of establishing the relative influence of modern antisyphilitic treatment on these patients with reference to their ultimate fate—physically, socially and economically.
4. To establish in each of the institutions mentioned a permanent file of the abstracted case records on congenital syphilis for the purpose of facilitating further research in the problem by the hospital staff.
5. To investigate the importance of syphilis as a factor in the causation of stillbirths, and to establish more definitely the frequency of osseous and visceral lesions in these patients.

It must be emphasized, however, that one of the principal aims of the project is to assist in the accumulation and ultimate distribution of facts about the disease to the public, as its part in the nationwide campaign to eradicate syphilis.

MARY D. GASTON
Project Supervisor

Boston City Hospital
Boston.

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

To the Editor: In addition to the articles enumerated in our letter of January 5 the following have been accepted:

Abbott Laboratories

Mixed Grass Concentrated Pollen Extract—Abbott (blue grass, orchard grass, timothy red top and sweet vernal grass, in equal parts)

Barry Allergy Laboratory, Inc.

Grass Mixture (Spring) Pollen Extract—Barry
Ragweed Pollen Extract—Barry

Mallinckrodt Chemical Works

Theobromine and Sodium Acetate — Mallinckrodt

Parke Davis & Company

Antipneumococcic Serum (Felton) Type I, Refined and Concentrated, 20,000 unit ambot package

Antipneumococcic Serum (Felton) Type I, Refined and Concentrated, 50,000 unit ambot package

Antipneumococcic Serum (Felton) Types I and II, Refined and Concentrated, 20,000 unit ambot package

Antipneumococcic Serum (Felton) Types I and II, Refined and Concentrated, 50,000 unit ambot package

Antipneumococcic Serum (Felton) Type II, Refined and Concentrated, 20,000 unit ambot package

Antipneumococcic Serum (Felton) Type II, Refined and Concentrated, 50,000 unit ambot package

The Smith Dorsey Company

Emulsion Liquid Petrolatum, Chocolate Flavored

Emulsion Liquid Petrolatum, with $\frac{1}{2}$ gr Phenolphthalein per fluid ounce, Chocolate Flavored

Emulsion Liquid Petrolatum, with 5 gr Phenolphthalein per fluid ounce, Chocolate Flavored

Frederick Stearns & Company

Thiamin Chloride Tablets — Stearns, 10 mg

The Upjohn Company

Ampules Mercuric Salicylate, 0.065 gm (1 gr), 1 cc.

Ampules Mercury Succinimide, 0.02 gm. ($\frac{1}{2}$ gr), 1 ccAmpule Solution Quinine and Urea Hydrochloride, 0.5 gm. ($7\frac{1}{2}$ gr) 1 $\frac{1}{2}$ cc.PAUL NICHOLAS LEECH, *Secretary*535 North Dearborn Street,
Chicago, Illinois

REPORT OF MEETING

SUFFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Suffolk District Medical Society was held at the Boston Medical Library on November 29, with Dr Reginald Fitz presiding. Drs William Leifer, Louis Chargin and Harold T Hyman, of New York City, spoke on "The Theory and Practice of Massive Dose Chemotherapy by the Intravenous Drip Method in the Treatment of Syphilis." In introduction, Dr Hyman discussed the history of intravenous therapy in general, with particular reference to experiments which showed that many untoward reactions were the result of "speed shock" which stimulated nutritoid crises and anaphylactoid reactions. Due credit was given Dr Rudolph Matas, of New Orleans, who first used the intravenous route of therapy in 1888.

Dr Hyman went on to tell of the conditions of their clinical experiments with the intravenous method of treating syphilis by massive chemotherapy. All cases were studied by a special committee, and no patients were seen by the original group after the termination of the primary phase of the treatment. A six bed ward was provided at Mt. Sinai Hospital where the early cases were confined for one week. Follow up visits were made to specified clinics, for which one dollar was paid for

each visit as an inducement. Triplicate blood smears were collected for examination by recognized independent serologists. Upon return to the clinic, there was complete physical examination, but no treatment was to any case.

Dr Leifer then discussed the technical details of intravenous chemotherapy which was employed. Without any specific preparatory treatment, the patient entered the hospital, where they were immediately bedded. A 20-gauge needle was used, and the injection always made into a vein of the mid forearm, so minimal amount of immobilization was necessary. An initial infusion of 20 or 30 cc. of 5 per cent solution, 0.1 gm of arsphenamine in about 125 cc. same solution was allowed to run into the vein in one hour. At this rate for ten hours on four successive days, an average dose of about 4 gm. was administered. The patients were allowed out of bed each evening, less there was some individual contraindication. Recipients were given the routine hospital diet and carbohydrate fluids were forced. Pretreatment consisted of a complete blood count, a platelet or determination of the nonprotein-nitrogen level, the bilirubin content and a van den Bergh test. Measurements of the arsenic excretion showed that about 20 per cent recovered in the urine and somewhat over 30 per cent in the stools. Studies on bilirubin excretion on successive patients showed that 3 developed liver dysfunction. No patients showed any toxic or nutritoid reaction or local infiltration. However, 44 per cent developed mild phlebitis, and 24 per cent moderate nausea and vomiting, usually with the "primary fever." A few had headache and diarrhea.

Two types of fever developed. The primary occurred about five to seven hours after the first injection and was accompanied by the above mentioned symptoms. The phenomenon, which was similar to a heimer reaction, was noted in 57 per cent of the patients, but the temperature always returned to normal the same evening or by the next morning at the latest. Continuation of treatment resulted in no exacerbation. The secondary fever, which usually appeared about the fifth day, had an incidence of 63 per cent, was accompanied by toxic cutaneous eruptions in some instances and lasted from two to six days.

The dermatological reactions were usually noted between the sixth to the eighth day and were shown to be benefited by 200 mg of cevitamic acid daily. Toxicoderma, with an incidence of 52 per cent, was accompanied by fever, headache and arthralgia. If previous antisyphilitic treatment had been given, its effect was earlier.

Two patients showed clinical as well as laboratory evidence of jaundice, while a larger number showed evidence of subclinical jaundice in the form of an elevated icteric index and bile in the urine. This, however, compared favorably with the incidence of these conditions in the ordinary arsenical treatment of syphilis where 1 in 75 and 1 in 4 have clinical and subclinical jaundice, respectively.

A marked decrease of platelets occurred twice, but one patient had previously had thrombocytopenic purpura and was relieved by splenectomy, while the other had acted similarly to other methods of arsenical therapy. Daily urinalyses occasionally demonstrated a transient slight albuminuria which soon cleared. There were no significant casts, and the nonprotein nitrogen level remained normal.

Probably the most significant toxic manifestation

polyneuritis which occurred in 32 per cent of the group of patients and in 38 per cent of the second, the administration to the latter of presumably adequate amounts of thiamin chloride. The onset of symptoms was two to three weeks following discharge, and mild symptoms and minimal signs persisted for three months. There was never any motor involvement, only 4 of 86 patients were incapacitated during this period. All showed complete spontaneous recovery except one was only one fatality and the presence of a post-mortem test was cited as probable evidence that a hemiplegic encephalitis was the cause of death. Dr. Leifer stated that there is the same mortality rate (1 per cent) in the usual forms of treatment and that the unfortunate case was probably due to an inherent specific sensitivity to drug.

Chargin compared the results of their treatment of those of other types of antisyphilitic therapy. Satisfactory results were obtained in 89 per cent of 78 observed cases, as compared with the 80 per cent of favorable results in a typical series of continuously and alternately treated patients. There were no positive cerebrospinal fluid findings in any case. The principal advantage of the method were its short duration and the dosage of arsenicals necessary. It was even suggested that smaller total amounts of the drug might be used.

Hyman, in conclusion, enumerated the following stages of the continuous intravenous method of treatment of syphilis: the patient is made noninfectious within eight hours; 100 per cent of those starting the course attain final cure and the total arsenical dosage is

He said that they believed that, with the exception of the polyneuritis, all the so-called toxic manifestations were merely evidence of sensitivity to the drug.

Opening the discussion, Dr. Nels A. Nelson lauded the method as a possible boon to the public-health man, but of syphilis but deplored the unfortunate publication of it as a sure four-day cure for the disease. He felt would bring unbearable pressure on the physician to use the still experimental therapeutic cure. He also desired to know the cost of such a cure.

Hyman assured him that publicity was the last thing desired. The cost of approximately \$100 per patient was not considered a true criterion of the event since that included all experimental work.

Only criticism offered by Dr. William Boardman at a follow-up of two or three years was not adequate in cases entirely asymptomatic and free of disease. The speakers granted that this was merely a preliminary report of a long-term experiment.

Austin Cheever was of the opinion that, as yet, the reactions were too high to warrant the use of this method of therapy in a disease where 28 per cent of patients are cured without treatment and an equal number remain asymptomatic despite positive serological tests. His answer by Dr. Chargin was that it is impossible to know who are to be the lucky ones.

In answer to a question from Dr. Marshall Crawford, Hyman replied that no correlation had been attempted in the work of Eagles, who showed that a relative concentration of arsenicals inactivated the *treponema pallidum* in vitro. It was believed that too many additional factors play a role in vivo to make these applicable in practical chemotherapy.

NOTICES

FAULKNER HOSPITAL

The monthly clinicopathological conference of the Faulkner Hospital will be held on Thursday, March 7 at 5:00 p.m. There will be a discussion of cases by Drs. James A. Halsted and Arthur R. Kumpston.

Physicians and medical students are cordially invited to attend.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital Chelsea, will be held at "The Hut," on Friday after noon, March 1 at 4:00. Mr. John C. G. Loring will talk, his subject being "Neurotic Alcoholism."

MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday February 27, at 5:00 p.m.

PROGRAM

The Passage of Thiocyanate and Glucose from the Blood Stream into the Joint Spaces. Dr. J. W. Zeller

Analysis of the Acoustics of the Stethoscope. Dr. H. B. Sprague and Mr. Maurice Rappaport.

Comparative Studies of the Effects of 200-Kilovolt and 1000-Kilovolt Roentgen Rays. The biologic effects on bone marrow growing epiphyses and skin. Dr. E. A. Gall.

JEWISH MEMORIAL HOSPITAL

A meeting of the staff of the Jewish Memorial Hospital will be held in the hospital auditorium, 45 Townsend Street, Roxbury on Thursday evening, February 29 at 8:30.

Dr. Joseph H. Pratt will speak on the subject "Pancreatic Disease." There will be an open discussion followed by a collation.

The medical profession is cordially invited to attend.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday February 27 in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance) at 8:15 p.m.

PROGRAM

Presentation of cases.

The Life History of Bone Grafts. Experimental and clinical observations. Dr. Ralph K. Ghormley, Mayo Clinic, Rochester, Minnesota.

Medical students and physicians are cordially invited to attend.

BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Tuesday February 27 in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon. The subject of the meeting will be "The New England Medical Center. Its origin, present activities and future plans" by Mr. Arthur G. Roach.

This meeting will inaugurate a series of talks on the past, present and future of the New England Medical Cen-

ter and its component parts Talks in the following months will be given by Dr Charles C Cabot and Mr Frank E. Wing on the Boston Dispensary, Dr Leonard J Carmichael on the Tufts College Medical School, Dr Elmer W Barron on the Boston Floating Hospital and Dr Joseph H Pratt on the Pratt Diagnostic Hospital Luncheon will be served to non members at 35 cents All interested persons are cordially invited to attend

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, February 28, from 2 to 4 p.m Drs Lyman Richards and Soma Weiss will speak on "Sore Throat"

Physicians and students are cordially invited to attend

PETER BENT BRIGHAM HOSPITAL

A research conference of the medical staff of the Peter Bent Brigham Hospital will be held in the amphitheater of the hospital on Tuesday, March 5, at 5 00 p.m

PROGRAM

- Blood and Urine Iodine in Diabetes Insipidus Drs H H Blotner and H J Perkin
Further Observations on Dynamics of Circulation in Patent Ductus Arteriosus Dr E C Eppinger

All interested persons are cordially invited to attend

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

There will be a meeting of the New England Society of Physical Medicine at 8 00 on Wednesday evening, February 28, at the Hotel Kenmore, Boston An informal dinner will be held in the Empire Room at 6 30

PROGRAM

- Symposium on the Treatment of Arthritis
1 Orthopedics Dr L T Swaim
2 Diet and Hygiene for the Arthritic Dr J P Bill
3 The Use and Abuse of Physical Agents Dr H A Osgood.

All members of the medical profession are cordially invited to attend.

EDWARD K DUNHAM LECTURES

The Faculty of Medicine of Harvard University has announced that the following lectures will be given by Dr S Walter Ranson, professor of neurology and director of the Institute of Neurology, Northwestern University Medical School, Chicago, under the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences

Monday, March 4 The Hypothalamus and the Sympathetic Nervous System.

Wednesday, March 6 Hypothalamicohypophysial Relationships

Friday, March 8 The Hypothalamus and Behavior

These lectures are scheduled for 5 00 p.m. at the Harvard Medical School, Amphitheater, Building C

NEW ENGLAND PATHOLOGICAL SOCIETY

The meeting scheduled for February 15 was not held because of the storm and has been rescheduled for Thursday, February 29, at 8 00 p.m at the Tufts College Medical School, 416 Huntington Avenue, Boston

PROGRAM

- Pathological Observations in Simmonds' Disease. I R C Wadsworth
Immediate Wheal and Erythema Type Reactions Simple Chemical Substances Dr John Jacobs
Pathological Findings in Leukoerythroblastic Anemia Dr S B Thorson
Primary Tumor of the Heart. Dr Harold Wood.

The pathological demonstrations will be available 7 00 p.m There will be a short business meeting followed by a collation

Physicians and students are cordially invited to attend

NORFOLK DISTRICT MEDICAL SOCIETY

The regular meeting of the Norfolk District Medical Society will be held in the Hotel Somerset, Boston, Tuesday evening, February 27, at 8 30 Tel KEN 2700.

PROGRAM

Business

The Uses and Abuses of Sulfanilamide and Related Compounds Dr Chester S Keefer Discusses will be opened by Dr John F Casey

Collation

AMERICAN PHYSICIANS' ART ASSOCIATION

The American Physicians' Art Association, composed of over eight hundred physicians in the United States, Canada and Hawaii who follow some form of fine or applied art as an avocation, will hold its next annual art show at the Belmont-Plaza, New York City, June 10-14, during the annual session of the American Medical Association All physicians, in active practice or retired, who have an art hobby, including photography, are cordially invited to participate in the New York exhibit.

A physician may join this association by mailing a check for one dollar to the treasurer, Dr R W Burlingame, San Francisco County Hospital, San Francisco, California, briefly stating what art medium the applicant follows For detailed information kindly write to the executive secretary, Dr F H Redewill, 526 Flood Building, San Francisco, California.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINS SUNDAY, FEBRUARY 25

SUNDAY FEBRUARY 25

- 4 p.m Sterility (lecture for women only) Dr Donald Free public lecture. Harvard Medical School, amphitheater Building D
4 p.m Surgery of the Blood Vessels and Extremities. Dr E. E. O'Neil Illustrated, public health lecture. Faulkner Hall auditorium

MONDAY FEBRUARY 26

- *8 15 p.m New England Heart Association Children's Hosp Boston

TUESDAY FEBRUARY 27

- *9-10 a.m Suppurative Disease of the Lungs Dr L F Dancy Joseph H Pratt Diagnostic Hospital
*12 m The New England Medical Center: its origin present and future plans Mr Arthur G Roitch Boston Dispensary
5 p.m Hospital Research Council, Massachusetts General Hospital
*8 15 p.m The Life History of Bone Grafts Experimental and observations Dr Ralph A Ghormley Harvard Medical School Peter Bent Brigham Hospital (Shattuck Street entrance)
8 30 p.m The Uses and Abuses of Sulfanilamide and Related Compounds Dr Chester S Keefer Norfolk District Medical Society Hotel Somerset Boston

WEDNESDAY FEBRUARY 25

- 9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
2-4 p.m. Fore throat. Drs. Lyman Richards and Norma Wells. Peter Best Brigham Hospital.
8 p.m. New England Society of Physical Medicine. Hotel Kenmore, Boston.

THURSDAY FEBRUARY 26

- 9-10 a.m. Derangements of the knee. Arthur A. Thibodeau. Joseph H. Pratt Diagnostic Hospital.
5 p.m. Renal Physiology. Dr. Donald D. Van Slyke. Harvard chapter of Nu Sigma Nu. Harvard Medical School, Bulfinch St. E.
8 p.m. New England Pathological Society. Tufts College Medical School.
8:30 p.m. Staff meeting. Jewish Memorial Hospital. 45 Townsend Street, Roxbury.
*Open to the medical profession.

FEBRUARY 22-24—American Orthopsychiatric Association. Page 937 issue of December 14.

FEBRUARY 23—Staff meeting. United States Marine Hospital. Page 84 issue of February 15.

FEBRUARY 25—Public lecture. Salem Hospital. Page 1042, issue of December 28.

FEBRUARY 25—Free public lecture. Quincy City Hospital. Page 77 issue of January 11.

MARCH 1—Staff meeting. United States Marine Hospital. Page 331.

MARCH 2, JUNE 8 and 10—American Board of Ophthalmology. Page 719 issue of November 2.

MARCH 4, 6 and 8—Edward K. Donham Lectures. Page 332.

MARCH 5—Research Conference of the Medical Staff. Peter B. At. St. Louis Hospital. Page 132.

MARCH 7—Clinicopathological conference. Faulkner Hospital. Page 331.

MARCH 7-9—New England Hospital Association. Hotel Seiler Boston.

MARCH 14—Peru Society Association of Physicians. 8:30 p.m. Hotel Burke, H. H. Hall.

APRIL 15-17—American Association for the Study of Gout. Page 203 issue of February 1.

APRIL 15-19—New England Health Institute. Page 244 issue of February 15.

APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.

MAY 10-18—American Scientific Congress. Page 1043 issue of December 22.

MAY 13—United States Pharmacopoeial Convention. Page 202 issue of February 1.

JUNE 7-9—American Board of Obstetrics and Gynecology. Page 1019 issue of June 15.

JUNE 10-14—American Physiological Art Association. Page 332.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MARCH 6—Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcus Infections. Dr. Chas. Lyons. Lynn Hospital, Lynn.

APRIL 3—Addison Gilbert Hospital, Gloucester.

MAY 8—Annual meeting. Salem County Club, Peabody.

FRANKLIN

MARCH 12—Franklin County Hospital, Greenfield.

MAY 14—Franklin County Hospital, Greenfield.

HAMPSHIRE

MARCH 13.

MAY 8.

Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Unicorn Country Club, Somersham.

MIDDLESEX NORTH

APRIL 24.

JULY 31.

OCTOBER 30.

ORFOLK

FEBRUARY 27—Page 332.

ORFOLK SOUTH

MARCH 7.

APRIL 4.

MAY 2.

All meetings, with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

MARCH 21—Goddard Hospital, Brockton.

APRIL 18—State Farm.

MAY 16—Lakeville Sanatorium, Lakeville.

SUFFOLK

MARCH 27—Scientific meeting. Symposium on Ulcerative Colitis and Diarrhea. Under the direction of Dr. Chester M. Jones.

APRIL 24—Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

MAY 2—Censors meeting. Page 244 issue of February 8.

WORCESTER

MARCH 13—Worcester Memorial Hospital.

APRIL 10—Worcester Hahnemann Hospital.

MAY 8—Worcester County Club.

Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting.

BOOK REVIEWS

The Evolution and Organization of the University Clinic
Simon Flexner. 41 pp. New York: Oxford University Press, 1939. \$1.25.

Two lectures given at the Nuffield Institute in Oxford in January 1938, by the Eastman Visiting Professor have been published in pamphlet form. They are distinctly worthy of preservation for much of the history of the development of the university clinic is contained in Dr. Flexner's brilliant review of this subject. As historical documents, these lectures are invaluable. Beginning with the first teaching laboratory of modern times, founded by Liebig in 1825 one is carried through the development of the university laboratory by Purkinje in 1842 and von Ziemssen in 1884 to the period of Virchow, Müller and Schönlein. Schönlein was followed by Frerichs and later by Traube and many others. American developments came much later. The first was that of Bowditch a pupil of Ludwig at the Harvard Medical School in 1871 and five years later Johns Hopkins University established a laboratory in biology including physiology for Newell Martin, a pupil of Huxley and Foster. In 1889 the year the Johns Hopkins Hospital was opened, most diagnostic laboratories were attached to the wards, but in 1893 with the founding of the medical school laboratories were established in relation with the pre-clinical sciences. The first actual hospital built wholly for research in clinical medicine, was that established by the Rockefeller Institute in 1910, in which Welch took a leading part. The latest addition to the long list of laboratories now established is that of the Nuffield Institute established by Lord Nuffield, long a friend of medicine. It seems not unlikely that the idea was implanted in Lord Nuffield's mind by Osler soon after he went to Oxford in 1905. The new laboratories with their full-time professorships should become an important center for medical research. No one could give them a happier start in medicine than Simon Flexner. These two lectures should be widely read by the medical profession in general.

Hospital Public Relations Alden B. Mills. 361 pp. Chicago: Physicians Record Co. 1939. \$3.75.

This book reflects the changing attitude of the public toward hospitals and of the hospitals toward their communities. Time was when hospitals were regarded with dread now they offer hope and inspire confidence. In the first chapters Mr. Mills sets forth some of the rea-

sons for this change of opinion, and the remainder of the book is devoted to showing why hospitals should explain themselves to the public and, since there is a right way and a wrong way, how it should be done. Inasmuch as hospital ethics closely follow medical ethics, it is necessary to remember that any public-relation program must respect the privacy of the patient and that the institution must avoid what might be termed advertising. Of course, one of the prime motives of public relations is to obtain support for the hospital, not only financial but also moral. In either case the program must be carefully prepared and thoroughly carried out. Careless and hasty planning and half-hearted or slipshod presentation spell failure.

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The plates are beautifully done and a joy to study. The diagrams and views for the most part differ from those found in general works on human anatomy, they constitute a valuable supplement to any such volumes the student may own. Their small size and compactness render them conveniently useful in the lecture room and laboratory. Their reasonable cost is another attractive feature. Individual sections may be purchased and vary in price from \$1.50 to \$3.50.

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THE VALUE OF ROUTINE BLOOD-PROTEIN DETERMINATIONS*

Report of Results in 320 Consecutive Cases

H. H. SHUMAN, M.D.,† AND HAROLD JEGHERS, M.D.‡

BOSTON

RECENT medical literature is replete with papers stressing the clinical importance of blood-protein determinations. Unfortunately the complexity of quantitative protein determinations has hindered the widespread use of this procedure.

Until recently the most widely used methods for blood-protein determinations included the macro- and micro-Kjeldahl, the colorimetric and the refractometric methods. These are complex procedures, relatively expensive as to equipment and to upkeep, and time-consuming even in the hands of experienced technicians. Both the clinician and the laboratory worker have long been in search of simpler methods. Several have been introduced and, though helpful, lacked quantitative accuracy.

The recently introduced Kagan's^{1,2} method compared for the first time simplicity with the desired quantitative accuracy. This method is rapid, the apparatus is inexpensive and the technique can be readily mastered by any technician.

Kagan checked the accuracy of this method against the macro-Kjeldahl method and found the greatest deviation in 107 specimens to be 0.48 gm per 100 cc., with a mean deviation of 0.16 gm. For clinical purposes such small deviations are irrelevant.

On the medical services of the Boston City Hospital it is customary to order blood-protein determinations only when specifically indicated, because the total number performed by the laboratory must necessarily be limited. The acquisition of a Kagan proteinometer by one of us (H. H. S.) suggested the idea of doing routine blood-protein determinations on a large series of consecutive admissions to the Fifth Medical Service. The present

paper summarizes and discusses the results secured in 320 such cases.

METHOD AND PROCEDURE

The falling drop method for determination of specific gravity was first published by Barbour and Hamilton.³ Moore and Van Slyke⁴ later worked out the relation between plasma specific gravity and plasma protein content. Kagan, using this knowledge, devised a practical clinical test whereby the total protein of blood could be determined by noting the rate at which a drop of serum or plasma fell a measured distance through a mixture of synthetic methyl salicylate and heavy California mineral oil. The principle of this method is based on Stokes law and is described in Kagan's papers. A standardized apparatus for performing this test is now available commercially.⁵

The technique used in our study was as follows: the blood of 320 patients admitted to the Fifth Medical Service during April and May, 1939, was subjected to Kagan's test, the blood sample being collected at the same time as that for the routine Hinton test. Two cubic centimeters was placed in a small, dry test tube and centrifuged until the serum separated from the clot. The serum and proteinometer were allowed to remain at room temperature for ten minutes before using. Kagan's technique was followed. By means of a calibrated pipette 0.015 cc. (15 cu. mm.) of serum was introduced into the glass cylinder of the proteinometer and the time required for the drop of serum to fall 10 cm. through the oil was measured to one-tenth of a second by means of a stopwatch. The protein value of the serum was obtained from a calibrated chart, due correction being made for the temperature of the oil. Most of the determinations required less than one minute for their completion, and all were made by one of us (H. H. S.). A dietary history, obtained by clinical clerks working on the service, was available in the majority

*From the South Department, Boston City Hospital; the Department of Medicine, Boston University School of Medicine; and the Fifth (Boston University) Medical Service, Boston City Hospital. This work was aided by a grant from the David Bradford Osgood Fund.

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‡Assistant professor of medicine, Boston University School of Medicine; senior visiting physician, Boston City Hospital.

⁵The Kagan proteinometer was obtained from E. H. Sargent & Co., Chicago.

sons for this change of opinion, and the remainder of the book is devoted to showing why hospitals should explain themselves to the public and, since there is a right way and a wrong way, how it should be done. Inasmuch as hospital ethics closely follow medical ethics, it is necessary to remember that any public-relation program must respect the privacy of the patient and that the institution must avoid what might be termed advertising. Of course, one of the prime motives of public relations is to obtain support for the hospital, not only financial but also moral. In either case the program must be carefully prepared and thoroughly carried out. Careless and hasty planning and halfhearted or slipshod presentation spell failure.

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uve thyroid crisis brings the subject within the province of the thyroid surgeon.¹² The condition may be the responsible factor or at least aggravate certain types of toxemia of pregnancy, thus making the subject of interest to the obstetrician.¹³ No doubt future studies will determine more fully the significance of hypoproteinemia.

The common causes of hypoproteinemia are given in Table 2. The complexities of this subject have been well reviewed by Melnick and Cowgill¹⁴ and Moschcowitz,¹⁵ and need no further comment here.

RESULTS

A summary of the general results is shown in Table 3. In the group of 320 patients, 238 (74.5

TABLE 3 Number and Percentage of Cases in Each Protein Range with Number and Percentage Showing Edema.

| PROTEIN RANGE | ALL CASES | | CASES WITH EDEM | |
|----------------|-----------|-------------------|-----------------|-------------------|
| | NO. | PER CENT OF TOTAL | NO. | PER CENT OF GROUP |
| gm. per 100 cc | | | | |
| Over 8.00 | 1 | 0.3 | 0 | 0 |
| 8.00-6.00 | 238 | 4.5 | 8 | 3 |
| 6.00-5.50 | 42 | 13.1 | 7 | 16 |
| 5.50-5.00 | 22 | 6.8 | 5 | 4 |
| 5.00 or less | 17 | 5.3 | 7 | 41 |
| Totals | 320 | | 27 | |

per cent) had total protein determinations within the normal range of 6 to 8 gm. per 100 cc. Only 8 patients (33 per cent) had edema,* 6 of these presenting cases of cardiac decompensation.

There were 42 patients (13.1 per cent) with total protein values ranging from 5.5 to 6.0 gm per 100 cc., 7 of whom (16 per cent) had clinically recognizable edema.

Twenty-two patients (6.8 per cent) had total protein values in the range of 50 to 55 gm per 100

an estimate of the dietary intake of protein. In 4 cases the diet was considered to be adequate with regard to protein intake. Other mechanisms for producing hypoproteinemia in this group include poor absorption (cancer of colon), poor utilization

TABLE 4 Data from Cases with Blood-Protein Values of 5.00 to 5.50 Gm per 100 Cc

| CLINICAL DIAGNOSIS | BLOOD PROTEIN gm per 100 cc | EDRMA | DIET |
|---|-----------------------------------|-------|--------------------|
| Diabetes mellitus | 5.49 | 0 | Inadequate |
| Tinea dorsalis | 5.04 | ? | ? |
| Lobar pneumonia | 5.21 | ? | ? |
| Pregnancy (7th month); bronchopneumonia | 5.42 | 0 | Adequate |
| Chronic stasis | 5.49 | 0 | ? |
| Peripheral vascular disease | 5.45 | 0 | Adequate |
| Chronic alcoholism | 5.35 | + | Grossly inadequate |
| Lobar pneumonia | 5.24 | 0 | ? |
| Medullary tumor | 5.49 | +++ | ? |
| Decompensated rheumatic heart disease | 5.31 | +++ | ? |
| Chronic alcoholism, beriberi | 5.19 | +++ | Inadequat |
| Chronic alcoholism | 5.40 | 0 | Inadequate |
| Jacksonian epilepsy | 5.35 | ? | Inadequate |
| Lobar pneumonia | 5.31 | ? | ? |
| Myasthenia | 5.21 | 0 | Adequate |
| Carcinoma of the colon | 5.14 | 0 | Inadequate |
| General vitaminosis | 5.32 | +++ | Grossly inadequate |
| Duodenal ulcer | 5.17 | 0 | Inadequate |
| Acute tonsillitis | 5.19 | 0 | Inadequate |
| Pulmonary tuberculosis | 5.35 | 0 | Adequate |
| Chronic alcoholism | 5.49 | 0 | Inadequate |
| Bronchopneumonia | 5.21 | 0 | Inadequate |

Means that a specific instance (was lack of) record.

(diabetes, acute and chronic infection) and heart failure.

Values of less than 5 gm per 100 cc. were obtained for 17 patients (53 per cent). The relevant data are given in Table 5. The most significant finding was the presence of edema in 7 (41 per cent) of these patients, 4 of them showing marked edema of generalized distribution. Where available, the dietary history revealed a grossly inadequate protein intake in almost every case. Liver disease, infection, poor gastrointestinal absorp-

TABLE 5 Data from Cases with Blood Protein Values below 5.00 Gm per 100 Cc

| CLINICAL DIAGNOSIS | BLOOD PROTEIN gms per 100 cc | EDEMA | PROBABLE REASON FOR HYPOPROTEINEMIA |
|--|---------------------------------|-------|--------------------------------------|
| Beriberi (polyneuritis) chronic alcoholism | 4.90 | ++ | Grossly inadequate diet |
| Portal cirrhosis, general ariam boile | 4.68 | +++ | Inadequate diet, liver disease |
| Chronic alcoholism, bronch bronchiectasis | 4.90 | 0 | Inadequate diet, chronic infection |
| Beriberi (polyneuritis) chronic alcoholism | 4.83 | +++ | Grossly inadequate diet |
| Carcinoma of stomach | 4.60 | 0 | Anorexia, poor absorption |
| Advanced pulmonary tuberculosis | 4.64 | 0 | Chronic infection, anorexia |
| Psychogenic vomiting | 4.67 | 0 | Diet adequate but not retained |
| General avitaminosis, chronic alcoholism | 4.73 | 0 | Inadequate diet |
| Scallity bronchopneumonia | 4.80 | 0 | Infection, anorexia |
| Scurvy | 4.83 | +++ | Grossly inadequate diet |
| Decompensated coronary heart disease | 4.18 | +++ | Grossly inadequate diet |
| Decompensated rheumatic heart disease | 4.55 | + | Adequate diet (cause not determined) |
| Generalized arteriosclerosis, scallity | 4.97 | 0 | Inadequate diet, anorexia |
| Carcinoma of large intestine | 4.83 | 0 | Inadequate diet, poor absorption |
| Bleeding peptic ulcer | 4.69 | 0 | Poor loss, poor diet |
| Idiopathic hypochromic anemia | 4.93 | ++ | Inadequate diet, poor absorption |
| Mucous colitis (7 years' duration) | 4.93 | 0 | Process lost, poor absorption |

cc., with 5 of them (22 per cent) showing edema. In only 1 case (a patient with avitaminosis) was there general anasarca. The diagnoses of patients in this group are given in Table 4, together with

tion and utilization, loss of blood and heart disease were important additional factors producing hypoproteinemia in some of these cases. Two patients had clinically recognizable beriberi, 1 had the classical picture of scurvy, and 1 evidenced

Edema here refers to peripheral pitting edema present on admission.

generalized vitamin deficiency. Less clear-cut evidence of deficiency—that is, dry or rough skin, stomatitis, glossitis, soft gums—was present in most of the other patients in this group, but such findings are naturally difficult to evaluate.

The large number of low protein values in our series suggested to us the necessity of checking the method in a group of healthy normal persons partaking of an adequate diet. Therefore, blood from 25 individuals (physicians, medical students, orderlies and technicians) was obtained and analyzed by the Kagan technic for total blood protein. The results are tabulated in Table 6. All,

average deviation of 0.14 gm. Our results indicate clearly that the detailed chemical procedures are no more accurate for routine work than is the Kagan technic, and might well be dispensed with in any busy hospital laboratory.

In only 1 case was hyperproteinemia discovered, a value of 8.73 gm per 100 cc being obtained in a case of multiple myeloma. The formol-gel and Takata-Ara tests were strongly positive, which suggested, although the albumin-globulin ratio was not determined, that the globulin fraction was greatly increased. The main clue to the diagnosis in this case was the hyperproteinemia. Our results show that hyperproteinemia is considerably less common than hypoproteinemia, at least among the average run of medical cases seen in this district. On an active medical service one would be unlikely to find more than five or ten cases in the course of a year. The diagnostic significance of the condition is so great, however, that even the rare case is worthy of consideration.

It has been stressed that the protein level of 8 gm per 100 cc or over for the diagnosis of hyperproteinemia is only relative, for actually it is the presence of hyperglobinemia that is the more significant.⁷ The Takata-Ara test is said to be positive when the globulin fraction is over 3 gm per 100 cc¹⁶ and the formol-gel test usually positive when the globulin value reaches 4 gm.¹⁷ For routine clinical work these simple laboratory procedures suffice to detect globulin increase and should be done along with the Kagan technic wherever possible. Only rarely will it be necessary to determine the globulin fraction by chemical analysis. Therefore, one should view any total protein of 7 gm per 100 cc or over with the same suspicion attached to values over 8 gm per 100 cc, provided the albumin-globulin ratio proves to be reversed. It would perhaps be wisest to have every protein determination, regardless of its level, accompanied by some estimate of the globulin fraction.

COMMENT

It was a distinct surprise to find that almost 20 per cent of the patients in this series had a protein value below normal, 12.1 per cent of the determinations were less than 5.5 gm per 100 cc, and 5.3 per cent were less than 5.0 gm (the level commonly accepted as being clinically significant). Edema was distinctly commoner in the low protein group, so much so, that in this hospital, at least, one would be justified in considering hypoproteinemia as the main, or at least a contributory, mechanism each time an edematous patient is studied. The difficulty of controlling cardiac decompensation in the presence of hypoproteinemia is particularly important,¹⁸ and is probably

TABLE 6 Protein Values on Blood from 25 Normal Persons, Ages 24 to 35

| BLOOD PROTEIN gm per 100 cc | NO. OF CASES |
|--------------------------------|--------------|
| 5.70-6.00 | 2 |
| 6.01-6.30 | 12 |
| 6.31-6.60 | 8 |
| 6.61-6.90 | 1 |
| 6.91-7.20 | 2 |

with 2 exceptions (5.93 and 5.70 mg per 100 cc) fell within the normal range. No adequate explanation for these two low values could be ascertained, the diet in each case being adequate. One could conclude that the low values for the hospital patients were not due to a tendency for this method to give low readings, but represent true cases of hypoproteinemia.

This is further shown to be true by comparing the 20 total blood-protein values obtained by the hospital chemical laboratory, where the standard

TABLE 7 Comparison of Blood Protein Values Obtained by the Falling-Drop Method with Those Obtained by Chemical Analysis

| KAGAN FALLING-DROP METHOD gm per 100 cc | MACRO KJELDAHL METHOD gm per 100 cc | MICRO- KJELDAHL METHOD gm per 100 cc | DEVIATION gm per 100 cc |
|--|--|---|----------------------------|
| 6.18 | | 6.3 | +0.12 |
| 5.70 | | 5.6 | -0.10 |
| 6.11 | | 6.4 | +0.29 |
| 6.39 | | 6.5 | +0.11 |
| 5.63 | | 5.9 | +0.27 |
| 6.21 | | 6.7 | +0.49 |
| 6.18 | | 6.0 | -0.18 |
| 6.80 | 6.7 | | -0.10 |
| 5.90 | 6.0 | | +0.10 |
| 4.64 | 4.6 | | 0.00 |
| 6.28 | 6.4 | | +0.12 |
| 6.00 | 6.0 | | 0.00 |
| 5.97 | 6.1 | | +0.13 |
| 5.52 | 5.5 | | -0.01 |
| 5.49 | 5.4 | | 0.00 |
| 6.14 | 6.1 | | 0.00 |
| 6.97 | 6.5 | | 0.47 |
| 6.69 | 6.7 | | +0.01 |
| 6.07 | 5.9 | | 0.17 |
| 8.73 | 8.9 | | +0.17 |

macro- and micro-Kjeldahl methods are used, with those obtained by the Kagan technic. The figures are shown in Table 7. It can be seen that the greatest variation was 0.49 gm per 100 cc, with an

often overlooked. In other words, the presence of edema in any form indicates the necessity for determining the blood protein level.

The influence of dehydration on the blood protein level was not considered in our patients but is extremely important. It is common for very ill patients to be dehydrated on admission, thus increasing the total protein value of the blood. With restoration of the fluid to normal, subsequent determinations may show the blood protein to be diluted sufficiently to produce hypoproteinemia. Therefore, a true estimate of the blood protein level cannot be secured until the fluid balance of the body has been restored to normal. This should be especially considered in those clinics where it is customary to take blood specimens immediately after the patient is admitted to the ward.

It is now generally accepted that few nutritional deficiencies occur singly. The discovery of one indicates the presence of others, even though not marked enough for clinical recognition. In this sense, the determination of the total blood protein value is at present the easiest laboratory test available for detection of a dietary deficiency. The presence of hypoproteinemia indicates the need for a dietary history and a thorough search for the clinical minutiae suggestive of other deficiencies.

In our own series, abnormal protein values were found as commonly as significant deviations from normal in the routine urinalyses, blood nonprotein nitrogen and sugar determinations, blood counts, Hinton reactions and so forth.

In the past, technical difficulties discouraged follow-up studies on patients with abnormal protein values. This technic encourages such studies.

With regard to treatment, it is obvious that most persons with hypoproteinemia will respond favorably to dietary measures alone. However, the presence of liver disease and poor gastrointestinal absorption or utilization may preclude such a simple approach. Where necessary, intravenous therapy in the form of blood transfusion or, if available in the future for general human use, injections of lyophilic serum¹⁰ or aminoacids¹¹ would be indicated for temporarily increasing the blood protein

level. The latter methods have potentialities certain to stimulate further studies.

SUMMARY

The blood-protein level for each of 320 medical patients and 25 controls was determined by the Kagan falling-drop technic. The method proved not only accurate but so simple that routine determinations were easily possible. Our results indicate that abnormal blood-protein values are commonly found on a general medical service. The significance of such changes has been briefly reviewed and discussed in the light of our results.

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SURGICAL PROBLEMS IN DIVERTICULITIS*

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BOSTON

BEFORE proceeding to a discussion of the surgical aspects of diverticulitis certain recognized facts relating to diverticulosis and to uncomplicated diverticulitis should be emphasized

In the first place, diverticula seldom occur in people under forty and are most often found in obese men over that age. During routine gastrointestinal x-ray examinations diverticula are found in 3 to 10 per cent of patients. At the Massachusetts General Hospital, for example, in 6426 consecutive barium-enema examinations, they were revealed in 3 per cent of the cases. Of this percentage only a small number of persons are likely to develop diverticulitis to a degree which will bring them to a doctor and permit a definite diagnosis to be made. The sigmoid is the commonest site of diverticulum formation, and diverticula are also most numerous in this area—both factors decreasing as the cecum is approached. The sigmoid is likewise by far the most frequent site of diverticulitis, even though the entire colon may be studded with diverticula. Diverticula without evidence of spasm by x-ray examination, and without clinical evidence of inflammation, need no treatment except encouragement of normal eating and bowel habits, in order to lessen the likelihood of diverticulitis. When inflammation does develop, the patient remains a medical problem unless complications of perforation or obstruction occur. In such an event, although operative procedures are not necessary in every case, the patient should be promptly observed by a surgeon, who can best assume the responsibility of deciding this point and carrying out the proper procedure. Finally, mild intermittent attacks of diverticulitis may go on for years without the occurrence of a perforation or of serious obstruction, while other cases are more fulminating and demand surgical procedures of varying number and degree.

ACUTE DIVERTICULITIS

A patient during an acute attack, with fever, pain and a palpable, tender mass, usually in the left lower quadrant, inevitably has an associated period of obstipation, due to temporary swelling

and obstruction in the sigmoid. Usually this situation does not demand surgery. Such an individual is best treated by rest in bed, morphine, the giving of fluids, freely by vein and in moderation by mouth, heat or cold applied locally for comfort, and abstention from the use of an enema until the process is definitely subsiding. Even then an enema should be given with extreme caution, using not over a pint of water, since perforation can be produced by fluid pressure. Mineral oil administered by mouth and by rectum in small amounts after four or five days is safe and of some benefit. No cathartics should be given. Under this type of treatment most cases will have subsided by the end of a week, the fever dropping, the pain lessening, the mass becoming less evident and bowel function re-establishing itself. On the other hand, persistence of or an increase in temperature, pain, tenderness and the size of the mass suggests the likelihood of a walled-off abscess from slow perforation, for which an operation will probably be necessary. It should also be remembered, however, that a small abscess resulting from perforation may establish spontaneous drainage into the bowel and recovery may ensue without operation. I have had at least 2 patients who were very sick for ten to fourteen days and in whom this unquestionably occurred, as determined later by barium enemas which revealed a perisigmoidal cavity in each.

It is a matter of considerable importance to decide rightly whether or not to explore a case of diverticulitis during an acute episode, and also to determine the best procedure after entering the abdomen.

I have reviewed the records of 140 cases of diverticulitis treated at the Massachusetts General Hospital by various surgeons from 1911 to 1936 inclusive, and also 35 cases from my own files. The figures in this paper, however, are based only on the former group. Of the 140 patients, 63 were operated on one or more times (Table 1), while 77 were treated without surgery. The number of operated cases in proportion to the total is, of course, much higher than would be true in a group of cases seen outside a hospital, since as a rule the sickest patients go to hospitals. Thus, in the 35 cases from my private practice, operative procedures were carried out in only 5 cases, or about 14 per cent of the total.

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Exploration of Uncomplicated Cases

Of the 63 Massachusetts General Hospital cases submitted to operation, 12 were explored during an acute attack and a mass in the sigmoid with out evidence of perforation was found. Of the 12 patients, 8 were sewed up without drainage and all recovered except 1, who died of peritonitis, due apparently to a perforation into the peritoneal cavity, which developed the day after operation. In the remaining 4 cases a drain was placed in the

latter died later of carcinoma, which was probably present originally. The 7 deaths from peritonitis might have been avoided by a delay in operation until the abscess either drained spontaneously into the bowel or increased sufficiently in size to be accessible through the rectum or the vagina or beneath the abdominal wall. In this group of cases, a cecostomy was performed at the same time in 1 of the 7 fatal cases and in 1 of the 7 recovered cases, a fact which seems to indicate that such a procedure is an unnecessary adjunct to simple drainage under such circumstances.

Three other acute cases developed low pelvic abscesses which were opened through the vagina, all the patients left the hospital, though 1 died two months later of sepsis.

TABLE 1 Operative Procedures on 63 Patients

| OPERATIVE PROCEDURE | No. of Times Performed |
|--|------------------------|
| Exploration, with or without drainage, in non-perforated cases | 12 |
| Exploration and drainage for sudden perforation with peritonitis | 3 |
| Exploration and drainage for slow perforation with abscess | 14 |
| Posterior colotomy for pelvic abscess | 3 |
| Cecostomy | 16 |
| Colostomy (descending colon) | 9 |
| Colostomy (trans cecum colon) | 10 |
| Mikulicz resection | 3 |
| Resection with end-to-end anastomosis | 2 |
| Anterior resection with permanent colostomy | 4 |
| Ileostomy | 3 |
| Exploration with resection of diverticulum | 3 |
| Total | 81 |

neighborhood of the mass, and all the patients recovered. It would appear from these figures that drainage is unnecessary when no perforation is discovered at operation, even though there may be some exudate present. Likewise, in retrospect, a decision not to operate at all would have been proper, although in some cases there was evidently sufficient doubt as to the preoperative diagnosis so that exploration seemed advisable. Those cases of acute diverticulitis, in which by virtue of the fact that the sigmoid lies near or to the right of the midline, a preoperative diagnosis of acute appendicitis is inescapable, demand immediate operation. Unnecessary exploration of uncomplicated cases should, however, be avoidable in most instances.

Sudden Perforation

A sudden perforation into the free peritoneal cavity is much less common than slow perforation. It occurred in only 3 of the 140 cases in this series. All 3 patients were operated on. One died of peritonitis and 1 recovered. The third case in which perforation occurred after exploration, has been mentioned.

Slow Perforation with Abscess

In another group of 14 cases, abscesses developed from slow perforation and were explored and drained through the peritoneal cavity, with a high mortality. Seven patients died in the hospital of peritonitis, while 7 recovered. One of the

CHRONIC OBSTRUCTIVE DIVERTICULITIS

Recurring attacks of acute inflammation in the same area eventually build up a chronically inflamed, thickened segment of bowel, which never returns to normal between the episodes. A narrowing of the lumen is continually present, though it may not be obvious on a liquid or low residue diet except during the exacerbations of inflammation. The sigmoid may have become adherent to the bladder during one of these attacks, with or without the formation of a fistula, if a fistula is present, the subsequent attacks are associated with dysuria and frequency, and also with pneumaturia. Fistulas may develop between the colon and the small bowel, rectum, vagina or abdominal wall. In this series there were 4 cases with vesicocolic fistulas, all operated on more or less successfully by multiple stages. One nephrocolic and 1 enterocolic fistula occurred, the former patient dying without operation, the latter after attempted repair.

Indications for Colostomy

Not infrequently, individuals develop intestinal obstruction to a degree which necessitates surgical relief by colostomy. In such cases it is often difficult to be certain whether one is dealing with cancer or diverticulitis, not only prior to operation but also after the abdomen has been opened. Regardless of whether the incision has been made on the right or left side, exploration is likely to be difficult because of distention. The differential diagnosis frequently cannot be made by palpation of the mass and often is in doubt even when the mass is visualized. Furthermore, it is frequently undesirable even to attempt exploration of the mass in the presence of marked distention.

Diversion of the fecal stream will cause the diverticulitis to quiet down in all cases, but the chronic obstructive process never can return to normal, and subsequent closure of the colostomy

is likely to produce a recurrence of the trouble. In one of our cases a barium enema fifteen months after colostomy revealed little or no reduction in the narrowing, closure, despite this fact, resulted in death of the patient from peritonitis.

Indications for Resection

There are several factors justifying radical surgery in an increasing number of cases of chronic diverticulitis. These are recurring obstruction and fistula formation, the possibility of perforation during further acute attacks, and the ever-present possibility that the obstruction may actually be due to cancer rather than diverticulitis, or to a co-existence of both conditions. The ability of a good radiologist to differentiate the two lesions by detecting the loss of mucosa due to cancer is a great help to the surgeon in deciding for or against operation.

TYPES OF OPERATIVE PROCEDURE

Since obstruction occurs almost invariably in the sigmoid — usually in its upper part — and since it seldom involves over 10 cm of bowel, it is possible in most cases to resect this segment and restore continuity, though a permanent colostomy will be necessary in some. Because of the inflammatory thickening of the mesosigmoid, which is often more prominent than is the thickening of the bowel itself, resection is more dangerous than in the case of cancer and should rarely be carried out as a single-stage procedure. A colostomy should precede resection.

Cecostomy, which diverts very little fecal material, is indicated only as the simplest method of relieving complete obstruction in a sick patient. It was performed in 16 cases in this series, with 1 death from peritonitis. In a number of these cases other procedures were also carried out, either before or after cecostomy.

Colostomy using the descending colon is ill-advised if future resection is contemplated, because the opening is situated too near the area of the second operation. Nevertheless, the descending colon was utilized in 9 cases in the series, with no operative mortality.

Complete diversion of the bowel contents is best accomplished by colostomy in the transverse colon, with section of the bowel. The two ends can be constructed for later closure either by the Mikulicz or the Devine method, the former being simpler, and probably just as efficient as the latter. Transverse colostomy was performed in 10 of our cases, with 1 death from pneumonia.

After several weeks' interval during which the defunctioned distal bowel is washed out daily, the obstructing segment can be resected and conti-

nunity re-established either by the Mikulicz method or by end-to-end suture, using basting stitches or an anastomosis clamp such as that devised by Young.* In a bowel cleaned out for several weeks, an open anastomosis can probably be done successfully, though the so-called "aseptic" methods are safer. A short, thick mesocolon, such as that found so often in heavy-set individuals, with its thickness increased by the chronic inflammation of diverticulitis, does not usually lend itself to a Mikulicz resection since the bowel is also short. Under these circumstances an end-to-end anastomosis is the only feasible procedure short of permanent colostomy.

In the Massachusetts General Hospital series, Mikulicz resection of the sigmoid was performed in 3 cases, all with good results. End-to-end suture was carried out in 2 cases, also successfully. Anterior resection, with a permanent colostomy and inversion of the rectal stump, was performed in 4 cases, with 2 hospital deaths from sepsis. Inversion of the stump is technically difficult as a rule, and if the stump is short it may not be possible to leave the inverted end within the peritoneal cavity without drainage, which is the best way to handle it. If the stump slips below the peritoneum, drainage should be carried out through the vagina or beside the coccyx, but even so, fatal retroperitoneal sepsis may occur.

Since it is impossible to know in advance which of the above procedures will prove to be best, and since resection with end-to-end suture without preliminary defunctioning of the left colon is risky, it is evident that a colostomy in the transverse colon should precede all resections of the left colon for diverticulitis and all attempts to disconnect and repair fistulas resulting from perforation.

Ileostomy was performed in 2 cases of the series, in one for gangrenous diverticulitis of the cecum and in the other to permit closure of a badly broken-down cecostomy stoma. Resection of a single diverticulum was carried out in 3 cases. Eighty-one operative procedures were performed in 63 patients.

END RESULTS

I have been able thus far to secure adequate end result data on 44 of the 77 unoperated cases and on 49 of the 63 operated cases, a total of 93 patients.

Of the 44 unoperated cases, 3 patients died in the hospital, and 14 died later. It developed that 2 of the latter group had cancer of the sigmoid as well as diverticulitis. In the other 12, death was also due to causes other than diverticulitis. Twenty-seven patients have remained alive for

*Young, E. L., Jr. A new instrument for intestinal anastomosis. *New Eng J Med* 206:943-945, 1932.

various periods of time, 19 without symptoms and 8 with recurring attacks.

Of the 49 operated cases followed, 28 patients died. Sixteen of these died in the hospital. Of the 12 subsequent deaths, 5 were due to what was reported to be cancer of the colon,—though this was not proved in every case,—4 to complications of the diverticulitis and 3 to unrelated causes. Twenty-one patients were still living, 5 with recurrent symptoms of diverticulitis and 16 apparently free from symptoms. Of the entire group of cases, 31 had only one operation while 18 were subjected to two or more surgical procedures.

CONCLUSIONS

Acute diverticulitis is always a nonsurgical problem unless perforation makes operation necessary.

Immediate operation is essential in a sudden acute perforation, while delayed operation is preferable in a slow perforation with abscess.

Chronic obstructive diverticulitis, with or without fistula formation, though relieved by complete diversion of the fecal contents, is likely to recur if the colostomy is closed. Resection, when the left colon has been rendered clean following colostomy, is a relatively safe procedure, and is usually indicated in these cases.

770 Commonwealth Avenue.

DISCUSSION

Dr. JOHN HODGINS, Boston. There is one aspect of this subject which I should like to speak of and that is the type of infection which is apt to spread especially into the retroperitoneal tissues. The effect is exceedingly dangerous and often fatal. Moreover, the intestinal bacteria may include the gas-forming organisms and at the Peter Bent Brigham Hospital several years ago a surgeon, in exploring a thickening not known to be due to diverticulitis,

examined and lifted the adherent sigmoid. In consequence the instruments became contaminated with the gas bacillus, and the patient and two others died before anyone suspected the possible presence of these bacteria. Of course ordinary scrubbing and boiling had failed to destroy their spores on the instruments.

Dr. WILLIAM C. QUINBY, Boston. A point which I think is worth noting in regard to those communications which sometimes occur as a result of perforation of a diverticular abscess into the urinary bladder is that in the majority of cases the opening formed is so small that it is rather hard to find by cystoscope as a result, the infection is usually not one which causes a great deal of bladder dysfunction—not much pain and frequency of urination, but nevertheless a persistent pyuria.

In the cases which have been spoken of as showing pneumaturia and so forth the communication into the bladder is usually in my experience, the result of an intestinal cancer rather than simple peridiverticular abscess. In these cases the area of the perforation into the bladder is much more readily seen through the cystoscope than it is in cases of the former type.

Dr. THOMAS H. RUSSELL, New Haven, Connecticut. It happens that I have 2 cases at the present time in which an intestinal resection has been done for diverticulitis. One is that of a woman of sixty-six who had a series of x-ray films taken eighteen months before which showed diverticula. She had an acute flare-up a few months before, and twenty-four hours before I saw her had an acute attack of vomiting. The leukocyte count was 23,000 and a mass was made out in Douglas's cul-de-sac. An operation was done ten days ago through a low midline incision. From the earlier x-ray films it was evident that the diverticula were very low. The upper portion of the rectum and the lower sigmoid were infiltrated with pus and the patient was very sick. I was able to deliver the inflamed loop, part of which was gangrenous. The patient is now making normal progress.

Three days ago I saw a man of sixty-seven who had had intermittent attacks of partial obstruction. It was decided to operate on him. A Mikulicz operation was more easily done in this case because the involved portion of the intestine was the sigmoid. I removed the loop of intestine yesterday and anticipate a smooth convalescence.

These two cases which were resected have been the only ones in which I thought it necessary to do a radical operation the others being treated conservatively or by simple drainage.

ANTEPARTUM GAS-BACILLUS INFECTION¹Report of a Case with Septicemia and Recovery
But with Death of the FetusSAMUEL A. COSGROVE, M.D.,[†] AND THOMAS A. BARRY, M.D.[‡]

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THE presence of *Clostridium welchii* in the genital tract is not uncommon. While all true strains of *Cl. welchii* are probably pathogenic, the presence of this organism does not necessarily signify infection, because Schottmüller¹ found it in the vaginas of healthy women. Certain prerequisites are necessary for pathogenicity, namely trauma and tissue necrosis. Falls² noted the presence of *Cl. welchii* in 63 per cent of a large series of prenatal patients. At the Sloane Hospital in New York City, Bysshe³ reported *Cl. welchii* in 25 out of 547 antepartum and postpartum patients, an incidence of 4.5 per cent. Of the 25 cases, 1 patient died presenting the typical picture of gas-bacillus sepsis, and 5 developed puerperal endometritis in which the only organism found was *Cl. welchii*. Peckham⁴ in his study of 545 patients ill with puerperal infection found the organism in only 0.6 per cent of those cultured.

Cl. welchii is probably present in a larger number of infected cases than one realizes, and apparently is not at all times an organism of high virulence but only when circumstances are favorable. If it were virulent, undoubtedly there would be far more deaths attributable to such infection.

In 38,330 deliveries at the Margaret Hague Maternity Hospital, only 3 cases have been definitely diagnosed as complicated by *Cl. welchii* infections. In 1934 a patient had an intrauterine *Cl. welchii* infection diagnosed at delivery of a full-term baby. The patient had been seen by a midwife, who examined her several times vaginally at home. She was treated with serum and recovered. In 1935 another patient entered the hospital with a high temperature, was delivered of a stillbirth and died of a pelvic gas bacillus infection within twenty-four hours. In the recovered case reported herewith the patient was proved to be infected systemically and locally with virulent *Cl. welchii*. There may have been other cases in which *Cl. welchii* was a factor in morbidity, but no other characteristic case in either mother or child has been noted. This fact, to-

gether with the known incidence of *Cl. welchii* in the flora of the birth tract, noted above, excites speculation as to the virulence of the organism and the conditioning factors.

We know that the organism is essentially a saprophyte, becoming pathogenic only when introduced into a tissue medium that fulfills the necessary prerequisites, that is, consists of tissue which is devitalized, dying or necrotic. De Kruif, Adams and Ireland⁵ and De Kruif and Bollman⁶ have amply demonstrated that the spores or vegetative organisms thoroughly washed free of toxin are far less virulent than are equal numbers of organisms not separated from the toxin. The primary conditions for infection are usually established by tissue damage resulting from wounds, areas of necrotic tissue furnish a favorable medium for the growth of the organism, making it possible for the bacilli to produce toxin, which eventually leads to toxemic injury and death.

In 49 cases with an abnormal pregnancy, labor or puerperium, Wrigley⁷ found *Cl. welchii* in the lochia of 13 patients and drew the conclusion that this organism is usually exogenous. He postulated the following conditions as necessary in order to have severe maternal infection: the organisms must be introduced into the uterus, they must find there suitable "dead" material—the fetus—on which to grow, the dead fetus must remain in utero a sufficient time for active infection to begin, and damaged maternal tissues must be exposed to this infection.

Another factor may be added: the presence of other organisms that affect the virulence of *Cl. welchii*. Lash⁸ reports that the pathogenicity can be considerably increased if the organism is growing in the presence of *Streptococcus haemolyticus*. As this has been confirmed by Falls,² we must be a little more guarded as to prognosis if the flora of the birth tract in a case of gas-gangrene infection also contains *Str. haemolyticus*.

CASE REPORT

D. M. (No. 38330), aged 19, was a primiparous white woman whose last menstrual period began December 27, 1938, and whose expected date of confinement was September 29, 1939. She entered the hospital June 28, with

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a history of irregular, cramp-like pains of 15 hours duration the membranes had ruptured 10 hours previously. The first trimester of pregnancy had been uneventful. The patient had noticed a sudden gush of blood not associated with any pain at about the end of the 3rd month. She had continued spotting for a few days after which the bleeding ceased.

Physical examination revealed a well-developed and nourished white woman in labor. The heart rate was 80, regular and of good quality. A harsh blowing systolic murmur was heard over the pulmonary area. The blood pressure was 118/70. The lungs were resonant throughout. The uterus was enlarged to 22 cm. above the symphysis, and the fetal heart could be heard in the midline, with a beat of 136, regular and of good quality. The presenting parts could not be identified abdominally. Rectal examination revealed the cervix to be effaced but not dilated and the vertex presenting. The temperature was 98.6 F, the pulse 80, and the respirations 20. The diagnoses were pregnancy 24 weeks, and inevitable abortion.

The labor pains gradually diminished but did not cease. The fetal heart weakened. The following day the temperature rose to 100.6 F. The intrapartum course was uneventful until June 30 when the labor pains increased to every 2 or 3 minutes. The cervix admitted 1 finger and no fetal heart could be heard. The membranes had been ruptured for 52 hours and the vaginal discharge, which had previously been clear, turned yellow and cloudy later becoming green and foul. The temperature gradually rose to 101.6 F., the pulse to 116, and the respirations to 26. The patient was taken to the delivery room at 10 p.m. with the caput showing, and delivered spontaneously a stillborn girl with obvious subcutaneous crepitation all over the body. No maceration was noted but the skin showed several large, reddish-blue areas. Cervical cultures were taken, and these, together with fetus and placenta were sent to the laboratory where smears were made from an incision in the muscles of the back of the fetus, which had a "cooked-meat" appearance. Microscopical examination revealed large gram-positive bacilli. The placenta showed two areas at the periphery 2 by 3 cm. in diameter which were fibrous and grayish white. The patient had a chill 1 hour following delivery, and blood was withdrawn 45 minutes later for aerobic and anaerobic cultures.

The anaerobic blood culture and cervical culture revealed marked gas formation after 10 hours growth. The organisms were large gram-positive, non-motile bacilli (Fig. 1). Rabbits injected intravenously with organisms from the blood and cervical anaerobic cultures and killed in 10 minutes were blown up with gas after 6 hours incubation. A guinea pig was injected with the organism cultured from the patient's blood. This pig died within 23 hours with evidence of gas in its tissues from which pure cultures of large gram-positive bacilli were recovered. A second pig was injected with the identical amount of culture and at the same time as the first pig but also received simultaneously a dose of polyvalent gas-gangrene antitoxin. This pig was alive and well in 24 hours and remained so. Since *Cl. welchii* is the only organism of the pathogenic group of gram-positive spore-bearing bacilli that is non-motile, and since it was obvious that the organism had killed the first guinea pig, we believe that this patient had a *Cl. welchii* septicemia. However further bacteriological studies were carried out with the following results: dextrose, lactose and saccharose were fermented with the formation of acid and gas; salicin was not fermented; there was no liquefaction of coagulated blood serum and gelatin was liquefied. Cultures of the organisms from

the patient's blood stream and from the guinea pig in litmus milk showed stormy fermentation. All the reactions were typical and conclusive proof of the presence of *Cl. welchii*. Blood cultures taken 24 hours later revealed no growth. Anaerobic cervical cultures taken every other day to July 8 yielded *Cl. welchii*. The next three cultures were negative.

Immediately following delivery a prophylactic dose (>500 units) of combined tetanus and gas-bacillus antitoxin and 4 gm of sulfanilamide were given. One gram of sulfanilamide and 1 gm. of soda bicarbonate were ordered every 4 hours. One hour later the patient had a chill the temperature rising to 104.0 F., and the pulse to 140 following which her condition seemed fairly good. A therapeutic dose (23,700 units) of polyvalent gas-bacillus antitoxin was given intravenously 3 hours after the first dose. A third and last injection (23,700 units) of antitoxin was administered 9 hours after the initial dose.

The sulfanilamide dose per day was raised in 24 hours to 6 gm. and continued from July 1 to July 8 it was then diminished to 2 gm. for 2 days and was stopped. The

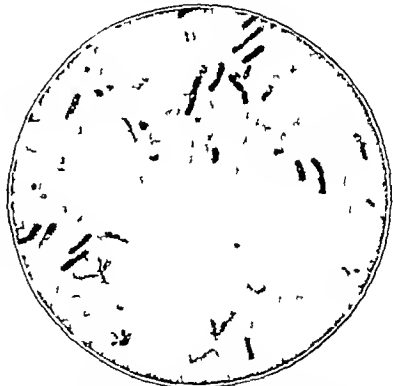


FIGURE 1 Smear from Anaerobic Culture of the Patient's Blood Showing Heavy Growth of *Cl. welchii*

blood sulfanilamide was between 8 and 9 mg. per 100 cc. until the dose was diminished, when it fell to about 5 mg. During the treatment with sulfanilamide, the patient developed a cyanosis. No evidence of jaundice or of hematuria was ever noted. The red-cell count varied between 4,400,000 and 3,575,000 and the hemoglobin from 88 to 70 per cent during the course of drug treatment. The white-cell count the day after delivery was 25,000 subsequently falling to 18,800.

The postpartum course was uneventful, except for an afternoon temperature rise to 99.5 or 101.0 F for approximately two weeks. The patient never appeared toxic or felt ill. The uterus involuted properly. She was discharged on July 16 to return in 2 weeks for a checkup at which time a cervical culture revealed suspiciously large gram positive bacilli but anaerobic culture failed to yield *Cl. welchii*.

The sequence of events relative to fetal and maternal infection in this case is of interest. It is

probable that organisms already present in the vagina ascended to the uterus or were carried there during intercourse, douching, bathing or frequent rectal examinations. Did the organisms go from the uterine cavity into the fetus with subsequent production of gas gangrene, or did they

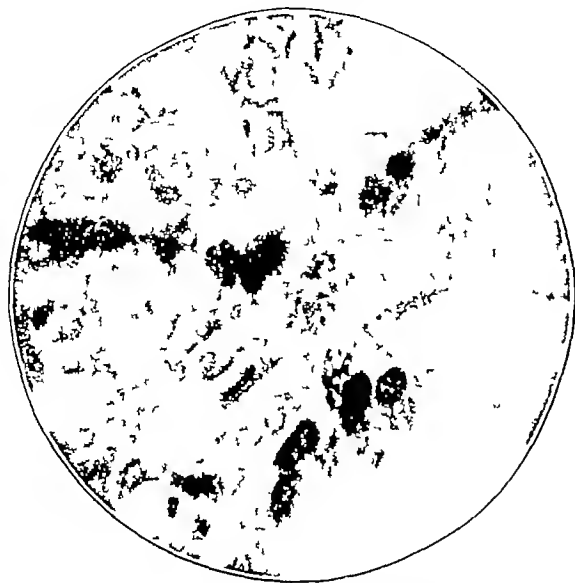


FIGURE 2 A Section of the Placenta Showing *Cl welchii* in the Intervillous Spaces

invade the placenta and thence the fetal circulation? Granting the possibility of the first sequence of events, we think the latter more probable.

The placenta revealed several areas near the

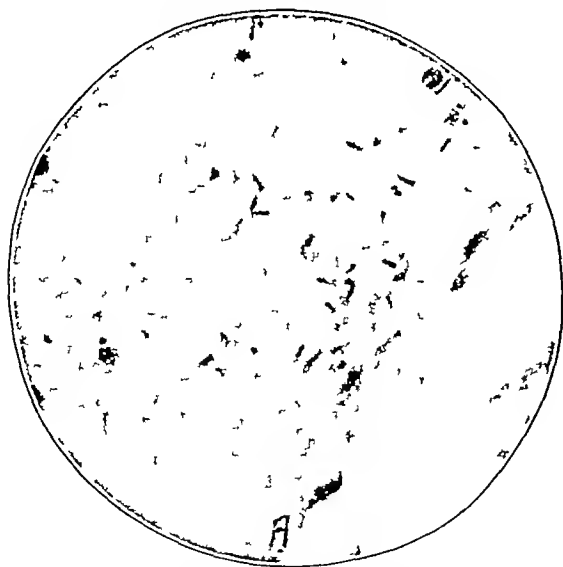


FIGURE 3 A Section of the Fetal Kidney Showing *Cl welchii* in the Lumen of a Small Artery
A indicates the wall of the artery

periphery that were white and firm. Specially stained sections of these areas revealed the presence of *Cl welchii* in the intervillous spaces (Fig 2). The organisms present in the uterine cavity

probably wandered in, invaded the dead tissue, grew and penetrated the placenta and thence the general fetal circulation (Fig 3), with subsequent death of the fetus. The fetal heart sounds were not obtained six hours before delivery, long enough for the classic picture of gas gangrene to develop before extrusion of the fetus.

If invasion was through the placenta with subsequent fetal death, it is reasonable to assume that the mother was infected at the same time, but evidence of severe infection did not develop until two hours after delivery and eight hours after the fetal death. The organisms present in great numbers in the infected endometrial cavity probably invaded the blood clots in the sinuses immediately after delivery, and from there found their way into the maternal blood stream. The mother had no chills prior to delivery, nor did her temperature reach its peak until she had the chill two hours post partum. This sequence of events would seem to suggest that spread of the infection was from the uterine cavity into the fetus ante partum and from the uterine cavity into the maternal circulation post partum.

The treatment of *Cl welchii* infection in general has seen a change during the last two decades from entire reliance on radical surgery to a more conservative form of therapy, with improved results. To surgery has been added serotherapy, at one time an adjuvant, but now on an equal status. Both have recently been complemented by a new agent, sulfanilamide.

Since most obstetric infections are intrauterine, surgery has always represented a hazardous and limited method of therapy. Obstetricians were forced to use conservative methods. Treatment with serum has had fair results, sulfanilamide now promises better ones. Bates,⁹ reviewing the cases of gas gangrene in a large surgical series, from 1926 to 1932, observed that the mortality was 56 per cent, equal to that of the World War period. In this series, the use of serum received but slight attention. Elason, Erb and Gilbert,¹⁰ reviewing the literature from 1930 to 1936, give the following figures: of 224 patients treated with serum, 56 died, a mortality of 25 per cent, and of 125 patients not treated with serum, 62 died, a mortality of 49 per cent. Millar's¹¹ statistics also showed a fall in mortality from 43 to 38 per cent following the use of serum. These figures indicate that serum has appreciably lowered the mortality.

Bohlman¹² reported dramatic results in a case of *Cl welchii* infection from the use of sulfanilamide. The patient had received a prophylactic dose of gas-bacillus antitoxin, but later developed gas gangrene in the lower extremities, for which sulfanilamide was given. It seems necessary to

assume some secondary therapeutic activity of the drug, besides the direct action, because Spray¹³ showed in vitro that *Cl welchii* is scarcely affected by any concentration approaching that tolerated in man.

This patient was treated energetically with both serum and sulfanilamide. Prostration, high fever, abdominal pains and vomiting were absent, although cyanosis was present. Since she received a large amount of sulfanilamide, it is hard to say whether part of the early cyanosis was caused by the infection or by the drug. She never appeared or felt sick during the entire stay in the hospital.

SUMMARY AND CONCLUSIONS

Clostridium welchii is an organism that will not cause damage unless the conditions are suitable. Once growth starts, the disease is not self limiting. As the toxins are liberated and more tissue is devitalized, the infection becomes greater. The uterus is a perfect incubator, the dead fetus an excellent medium. Since there is no way of telling whether the dead fetus is infected, one is forced to await the outcome of a delivery before making a diagnosis.

Surgery has no definite place in the therapy of obstetric gas-gangrene infection, because the uterus is not properly situated for surgical attack. Obstetricians are thus limited to conservatism. Antitoxin has proved its worth to some extent. Sulfanilamide seems also to have value. The combination of both appears to be the ideal method

of therapy, the drug producing bacteriostasis, and the antitoxin, neutralization of the toxin.

Although each form of therapy has been shown to be curative, it cannot be proved which exerted the greater effect in this case, because both forms were given at the same time and were continued. This case clearly showed that the desired effect can be obtained by combined therapy, because the patient did not develop any of the most distressing of the characteristic symptoms of *Cl welchii* infection. We believe that this form of therapy will do much toward lowering morbidity as well as mortality.

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symptoms. The dietetic treatment of moderately severe cases consists in the use of a diet low in carbohydrate, high in fat and normal in protein and frequent feedings.³ This case of the severe type was treated with diet and gland therapy with marked improvement. There is an advantage in using low percentage fruits and vegetables, since their slow digestion yields only small quantities of glucose at a time, by which process the minimum stimulation of insulin is brought about. Fats, in the form of milk and cream, given with and between meals, are believed to delay assimilation of the carbohydrates by allowing the stomach to empty slowly.⁴ Mixed gland therapy is recommended when the attacks cannot be controlled by diet.⁵ Operation on the pancreas is justified in cases in which there is a constant uncontrollable tendency for the blood sugar level to fall below 50 mg per 100 cc., thus preventing the patient from earning his living.⁶

To bring a patient out of an attack when he cannot co-operate by swallowing sugar syrup or

sweetened orange juice, intravenous injections of glucose must be given. Adrenalin, pituitary extract and thyroid substance have also been used.

The prognosis is usually favorable since in the majority of cases the state is purely functional, with no organic lesion in the pancreas or other glands of internal secretion.

SUMMARY

A case of the severe type of hyperinsulinism is presented and briefly discussed.

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REPORT ON MEDICAL PROGRESS

CHILDREN'S SURGERY

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BOSTON

APPENDICITIS

APPENDICITIS continues to claim consideration, since it remains a factor of major importance in childhood mortality. Better nutritional standards and more effective public health measures have resulted in a lowered child mortality rate, so that more children are saved from other diseases to suffer from, and all too frequently to die of, appendicitis. The annual number of child deaths from appendicitis has declined but little and the child population appears, temporarily at least, to be stabilized. The general death rate in Massachusetts per 10,000 children under ten years of age was 669 in 1920, 324 in 1930 and 180 in 1936, but the rate for children with appendicitis was 8.2 per cent in 1920, 15.9 per cent in 1930 and 10.6 per cent in 1936†. Only pneumonia and accidents exceed appendicitis as a cause of death in this age group.

Unfortunately, the idea remains fixed in the

public mind that the young need not be suspected of appendicitis and, more unfortunately, there is reason to suppose that some physicians fail to consider such a diagnosis early in the course of an attack.

Certain facts are established. Appendicitis occurs in the young with reasonable frequency, and is a killing disease if not recognized and treated promptly. There is no nonsurgical method of treatment of merit. Operation before peritoneal infection is present is absolutely curative, with essentially no surgical risk. When properly managed the young are excellent anesthetic and surgical risks, but they must be well managed.

Considering these facts, control of morbidity and mortality can be reduced to three elements: first, the public must realize that a physician should be called promptly whenever there is a complaint of abdominal pain; second, physicians must become appendix-conscious and really examine the child patient; and third, appendectomy must be performed expeditiously if a diagnosis is established and such operation should be considered seriously if appendicitis cannot be excluded from

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†These statistics represent calculations by Dr. H. W. Hudson, Jr., from material submitted by the Massachusetts Department of Public Health, and refer to conditions in Massachusetts only.

diagnosis. If these conditions were fulfilled there would be no appendicitis problem. Until a level of education is reached which attains these three elementals, both long periods of morbidity and deaths will result from peritonitis of appendiceal origin. It is my considered opinion that discussion of treatment of the desperately ill patient should be confined to surgical meetings and surgical literature. I believe that open discussion of methods which are still matters of surgical opinion has resulted in harm, in that it may have given rise to the entirely erroneous idea that there is both a medical and a surgical method of managing appendicitis. *There is no medical treatment.* The questions of delayed operation with Ochsnerization (with its modifications), drainage versus no drainage, enterostomies of various types, serotherapy, chemotherapy, the use of coli-bactrogen, types of incision used to approach an appendix, and the time at which to approach it, and the use of drugs to maintain intestinal tone or stimulate peristalsis will not be discussed here.

Decompression of the intestine by means of Wangenstein's¹ technic, lessening of distention by the use of an atmosphere of high oxygen tension, as recommended by Fine, Hermanson and Frehling,² the control of hydration, the maintenance of blood-electrolyte levels, the prevention of ketosis by parenteral fluid administration and the use of blood transfusion for low serum-protein levels are all advances of proved merit in the control of the desperately ill.

Real progress will be made when children are referred for surgery earlier in the course of their disease. In this connection the lowering of mortality in the Children's Hospital series of cases of proved acute appendicitis with and without complications is encouraging. For the period 1929-1938 the death rate was 3.06 per cent, for 1929-1933 it was 3.6 per cent, for 1933-1938 it was 2.3 per cent, and for 1938 and 1939 it was 2.2 per cent.³ Although improved methods play a leading role in this reduction, the fact that fewer patients presented peritoneal complications was also significant. This, we believe, represents progress in the control of appendicitis mortality.

EMPHYEMA

The treatment of acute empyema, especially in children, has received much discussion since the war. The three forms of treatment—repeated aspiration, intercostal closed drainage and open drainage, with or without rib resection—have each had their strong proponents and opponents. It is becoming more widely appreciated, however, that each of these methods has its usefulness, its indi-

cations and its contraindications. It is fundamental to realize that each patient must have that form of treatment that is best suited to the etiologic organism, the stage of the disease and the age of the patient. The improvement in the results during the last five years at the Children's Hospital⁴ was effected largely because no routine form of treatment was used. One, two or all three forms of treatment have been used as the individual case warranted.

Acute empyema should never be regarded as a surgical emergency but rather as a complication of an acute primary disease. Diagnostic aspiration is important in all cases, and methods of drainage should be based on the bacteriological findings as well as on the stage of the disease and the age of the patient. During the pneumonic stage treatment should be instituted only when necessary in order to relieve the mechanical embarrassment of the heart and lungs, and then only by repeated aspiration or occasionally by closed drainage. Open drainage should never be done in the pneumonic stage. In properly selected cases, however, primary rib resection is a rapid and efficient method of treatment, and it is also useful as a secondary procedure when intercostal drainage has proved inadequate. Local anesthesia for aspiration and intercostal drainage, and nitrous oxide and oxygen for open drainage, are favored. Scoliosis need not be feared if the cavity is well drained and the lung re-expanded. By following these principles the mortality has been reduced in the last five years to 2 per cent in 137 cases. The mortality in patients under two years of age was reduced to 4 per cent in 46 cases.

CHRONIC PULMONARY SUPPURATION

Chronic suppurative lesions of the lungs in children can be treated successfully by radical lobectomy or pneumonectomy, and these radical procedures should not be withheld on account of the age of the patient. Although the causative agent in many cases of pulmonary chronic suppuration is obscure, prevention is of course far better than treatment after suppuration has occurred. Particularly in this age group the possible presence of a foreign body must always be considered and ruled out in any case of infection of the lung that does not respond to the usual therapy. The presence of an atelectatic lobe in recurrent pneumonia must also be considered as an underlying cause of chronic suppurative disease in the lung. In many cases, chronic lung suppuration that follows acute empyema can probably be avoided by adequate treatment of the empyema during its acute stages. There remain other cases for which no definite etiology has as yet

been found. These cases need careful bacteriological study and the closest observation, including repeated x-ray photographs after injection of Lipiodol. If, after a varying period of weeks, the process shows no signs of improvement, radical removal of the diseased portions of the lung must be considered. With too long a delay the process may go on to gangrene and so preclude successful radical removal. It is difficult as yet to assign any absolute time limit at which radical treatment should be instituted.

At the Children's Hospital there have been 14 lobectomies performed for chronic lung suppuration, with no deaths. There have been 6 total pneumonectomies, with 2 deaths. One of these deaths might have been avoided had radical surgery been done at an earlier stage of the disease.

DUPLICATION OF THE ALIMENTARY TRACT

Duplication of the alimentary tract is a term which has been used to describe a condition which has heretofore received a variety of titles, none of which are both accurate and inclusive.

Pathology

Duplications of the alimentary tract are hollow structures which possess two muscular coats and are lined by epithelium similar to that found in various segments of the gastrointestinal tract. These lesions are almost always contiguous to some portion of the alimentary tube. The type of epithelium lining the duplication does not necessarily correspond to that part of the alimentary tract to which the structure is attached. The cystic structure may or may not communicate with the adjacent intestinal lumen.

An important finding is the histological fact that the muscular coats of the duplication are intimately associated with or are an integral part of the muscularis of the alimentary tract.

The contents of the duplication vary with the type of epithelium lining the structure, with the presence or absence of a communication of the adjacent intestine and with the presence or absence of necrosis of the duplication wall. If there is a communication with the bowel, the duplication contents naturally are similar to those of the adjacent bowel. If there is no communication the contents usually contain a clear colorless fluid of mucoid consistency.

Clinical Findings

This condition is usually observed in children. The symptoms may be grouped under three headings: obstruction of the alimentary tract by regional external pressure, pain produced by distention of the cystic structure and hemorrhage be-

cause of interference with the intestinal blood supply, leading to sloughing of the intestinal mucosa.

Duplications may occur at any point from the mouth to the rectum, and the symptoms, of course, vary with the location of the condition. In a lesion appearing at the base of the tongue, difficulty in swallowing was the outstanding symptom in this series. With the duplications in the mediastinum, difficulty in swallowing and interference with expansion of the lung leading to dyspnea were the prominent symptoms. In a duplication of the stomach, the symptom was that of epigastric fullness and pain, produced by tenseness in the mass. Most of the cysts of the duodenum, jejunum and ileum brought early signs of partial intestinal obstruction characterized by colicky pain, vomiting, increased peristalsis and finally signs related to dehydration. In a duplication of the terminal ileum, the complaints were related to severe painless hemorrhage from the lower intestinal tract caused by ulceration and sloughing of the ileal mucosa. In one case the duplication of the ileum was the advancing point of an intussusception and gave the usual symptoms of that condition. The duplication of the rectum caused early constipation and abdominal distention.

By physical examination these masses can usually be felt and a correct diagnosis is often suggested. The tumors were elastic, usually non-tender and well rounded, and except for the duodenal lesion, were quite freely movable within the abdominal cavity. Intestinal duplications all showed signs of partial intestinal obstruction, such as visible peristalsis, localized abdominal distention and increased audible peristaltic activity. The cyst of the rectum could be easily palpated by rectal examination, and was sufficiently large so that the examining finger could not be pushed beyond the compressed point.

Treatment

The structure of these lesions is important in relation to operative procedures. First, the cyst and the intestine have a common wall and the two cannot be dissected apart with safety. Second, an attempt to remove the cystic structure locally may interfere with the blood supply of the intestine and cause necrosis.

The thoracic lesions may present great difficulty, particularly in the very young. Freeing the cystic structure from the lung is comparatively simple, but when one attempts to dissect it from the esophagus there is danger of entering the esophageal lumen, and the possibility of a fatal mediastinitis or an empyema or an esophageopleural fistula is great. As a result of my experience, I believe that these cases are better treated

diagnosis. If these conditions were fulfilled there would be no appendicitis problem. Until a level of education is reached which attains these three elementals, both long periods of morbidity and deaths will result from peritonitis of appendiceal origin. It is my considered opinion that discussion of treatment of the desperately ill patient should be confined to surgical meetings and surgical literature. I believe that open discussion of methods which are still matters of surgical opinion has resulted in harm, in that it may have given rise to the entirely erroneous idea that there is both a medical and a surgical method of managing appendicitis. *There is no medical treatment.* The questions of delayed operation with Ochsnerization (with its modifications), drainage versus no drainage, enterostomies of various types, serotherapy, chemotherapy, the use of coli-bactrogen, types of incision used to approach an appendix, and the time at which to approach it, and the use of drugs to maintain intestinal tone or stimulate peristalsis will not be discussed here.

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ures, namely tapping or exploratory burr holes, are necessary becomes increasingly clear as data on these cases accumulate. I am correspondingly less impressed by the lack of history of trauma in these patients. Although parents are carefully questioned on this point, young patients are continually seen with extensive fractures but no history of injury. These fractures have for the most part been seen in otherwise normal bones, and are presumably not due primarily to a deficiency state.

A preliminary survey of the intracranial tumors verified in the Children's Hospital since 1930 shows an interesting pathological distribution. The relative frequency of the various types of tumors in this series does not correspond to those previously reported by others, this difference being of significance chiefly because of the current impression that medulloblastoma is the commonest intracranial tumor of childhood. This impression has, in fact, been advanced as an argument in favor of radiation therapy without exploration, decompression and biopsy. In the series there were 32 astrocytomas and 19 medulloblastomas, a sufficient preponderance of the surgically favorable type to make the supposed high frequency of medulloblastoma an entirely incorrect basis for such therapy. In addition, an analysis of the histories shows that it is frequently quite impossible to make an accurate preoperative pathological diagnosis, preoperative radiation therefore resulting in a very serious loss of time in the less invasive tumors.

The other 35 tumors in the series showed a wide range of cellular structure, from entirely benign dermoid cysts to very rapidly growing invasive tumors, such as glioblastoma multiforme. There were 7 craniopharyngiomas, 1 of which it was

possible to remove in its entirety without residual damage. In the other craniopharyngiomas evacuation of the cyst, with piecemeal and presumably incomplete removal of the wall, had to suffice, but the results even in these cases have been very encouraging. It is obviously essential that these patients receive whatever treatment is possible at an early date before optic atrophy has progressed too far.

It may be worth while emphasizing the fact that children with signs of increased pressure, such as headache, vomiting, papilledema and so forth, or with any disturbance of motor function, except when it is known to be due to a fixed lesion should receive a complete neurological study, and if there is any doubt whatever they should be suspected of having a brain tumor and examined at frequent intervals with that possibility in mind. There is ample proof that many brain tumors of childhood are susceptible of surgical treatment with little or no residual damage if operation is done early enough. In the presence of an operable tumor the removal of which offers a good prognosis, it is therefore extremely important to avoid preliminary trial x-ray therapy or prolonged observation which may leave permanent blindness or motor dysfunction.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26091

PRESENTATION OF CASE

A fifty-six-year-old man was admitted to the hospital complaining of painless hematuria.

The patient had enjoyed perfect health until one week before admission when for the first time he passed a large amount of bright-red blood in his urine. Following this he noticed a sharp non-radiating pain in the right flank, which lasted some twenty minutes and disappeared gradually without residual discomfort. He continued to pass blood in decreasing amounts for the next four days. For three days before admission, however, the urine was "dark," but no fresh, bright-red blood was noted. He had experienced no chills, fever, nocturia, frequency, urgency, dysuria or pyuria. He had lost no weight and had noted no other symptoms.

The patient had been in close contact with a brother, who had spent six months of the past year in a local sanatorium because of "weak lungs," and a niece, who had died of tuberculosis eight years before the patient's present illness. The remaining family, marital and past histories were negative.

Physical examination revealed a slender, well-developed man, who lay quietly in bed in no apparent distress. The teeth were carious. Examination of the heart, lungs and abdomen was not remarkable. The genitalia were negative except for the presence of a small, smooth, cystic mass in the globus major of the right epididymis. The rectal examination was negative. The blood pressure was 150 systolic, 80 diastolic.

The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 5,300,000 with 177 gm hemoglobin (photoelectric-cell technic), and a white-cell count of 19,000 with 78 per cent polymorphonuclears. The blood smear was negative, the platelets were normal. The urine was cloudy, amber in color and acid, with a specific gravity of 1.016 and a + albumin test. The sediment contained 40 to 150 red blood cells, 5 to 8 white blood cells and 2 epithelial cells per high-power field. The blood Hinton test was negative. The blood sugar and nonprotein nitrogen determinations were normal.

Culture of bladder urine showed a moderate growth of *Staphylococcus aureus* and an abundant growth of nonhemolytic streptococci.

Intravenous pyelograms showed that the kidneys were normal in size, shape and position. There were no visible stones. The intravenous dye appeared promptly and demonstrated normal urinary passages on the left. On the right side there was a sharply defined filling defect occupying the upper major calyx and upper portion of the renal pelvis. The lateral margin of the pelvis in this area showed a slight pressure defect, and there appeared to be slight spreading of the upper and middle calyces. The bladder showed a pressure defect in the region of the prostate. A right retrograde pneumopyelogram confirmed these findings. There was a definite intrapelvic filling defect in the right kidney, which was the same size and shape as that previously demonstrated by the intravenous pyelograms. The margins of this defect were slightly irregular, and it appeared to extend upward along the upper calyx of the kidney. The bladder was not demonstrated.

On the fifth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR J. DELLINGER BARNEY: The causes of hematuria are legion and we cannot go into all of them here. When we speak of painless hematuria we usually mean that there are no particular symptoms associated with it. This patient had right flank pain, and there are many causes, of course, for that. But we have to consider the possibility that this man had a tumor in this kidney, the pain being caused not by the tumor but by the formation and passage of large blood clots. Or, he might have had an acute inflammatory disease of the kidney—I refer to carbuncle or multiple cortical abscesses. Or, he might have had a perinephritic abscess, or an acute hemorrhagic nephritis, in which, as Dr. Holmes and I recall very well, the findings may very strongly suggest those of a renal tumor. The fact that he had lost no weight indicates it was not a long-standing process.

His association with two individuals who apparently had tuberculosis might throw some light on the question, but I do not believe it does in this particular case. With the story we have already heard and contact with these individuals, we have to consider the possibility of tuberculosis of the urinary tract. On the other hand, in my experience, renal tuberculosis does not produce massive hematuria or pain, and there is microscopic hematuria rather than gross.

The fact that the temperature, pulse and respirations were normal indicates there was no acute

inflammatory process in the urinary tract. The lungs were said to be negative but that does not absolutely rule out tuberculosis. It comes rather close to it, however. From the description I should think the mass in the epididymis was probably a spermatocele, which occurs not infrequently, is smooth and cystic, varies in size from that of a pinhead to that of an English walnut, occurs in the globus major, and would probably not be confused with epididymal tuberculosis. This might have been a neoplasm of the testicle or the epididymis, but I believe it was a spermatocele. The fact that the rectal examination was negative indicates that there was no obstructing prostate which was large enough to protrude into the rectum. It also suggests that there was no abscess, carcinoma or tuberculosis of the prostate.

Examination revealed that the blood picture was essentially normal. The rather high white-cell count may have been secondary to hematuria or in other words, to the loss of blood. The urine apparently had cleared and was no longer grossly bloody, but the fact that it contained red cells indicates residual blood or persistent, although diminished, hemorrhage. We can rule out any serious inflammatory process by the fact that there were very few white cells in the sediment. Apparently there was very little kidney damage inasmuch as the blood nonprotein nitrogen was normal.

Culture of the bladder urine showed that it did contain bacteria but we not infrequently culture organisms of one sort or another even streptococci or staphylococci, without fever and other clinical manifestations of sepsis. One would have to hunt for the possible focus from which these bacteria came.

The fact that the intravenous pyelogram showed the kidneys normal in size, shape and position tends to eliminate certain things, namely kidney tumors such as hypernephroma or adenocarcinoma, which would probably have caused enlargement of the kidney or an irregularity in its contour where the tumor bulged out from the side. In tuberculosis of the kidney one might not get any particular change. In an inflammatory condition, such as a pyelonephritic kidney, one would find a larger kidney than is normally found. A solitary cyst generally indicates its presence by deformity of the normal kidney outline, but we cannot rule it out. The dye was excreted normally and apparently equally by both kidneys, so that the kidney function was good. In other words, the cortical substance of the kidney had not been badly damaged. But on the right side we find a filling defect occupying the upper major calyx and

the upper portion of the pelvis. This filling defect was found again in the retrograde pyelogram, as we may see in the x ray films. Obviously there was something affecting the pelvis and upper major calyx. The filling defect in the bladder in the region of the prostate may have been due to an enlarged lobe of the prostate. We may see very markedly enlarged prostates at the age of fifty six, but such is not usually the case. The rectal examination is said to have been negative, however, which would be improbable had there been an enlargement of the prostate sufficient to cause a filling defect in the x ray film. The filling defect might have been due to tumor of the bladder or to a blood clot which was lying in the bladder. There are various possibilities.

May I see the x-ray films?

DR. GEORGE W. HOLMES: Apparently we do not have the film that shows the injected pelvis.

DR. OTTO SAHLER: There was only an air injection.

DR. HOLMES: I am glad to know this. I thought I was looking at gas in the colon. You can see the deformity described, also in this film the filling defect and the narrowing of the upper calyx. Of course the patient had been bleeding, and you have to consider the possibility of blood as well as that of tumor. Blood clots as a rule do not extend into the upper calyx without involving the lower calyx. The character of the defect itself is not that seen with blood clot, and we have further evidence of a deformity in a film taken on another day. I think we are safe in saying that it does represent a true lesion in the kidney pelvis. The films do not permit me to say positively that the lesion is a tumor.

DR. BARNEY: As you can see fairly well, the kidney outline is normal in size, without bumps on its contour such as would be expected with a tumor of the cortical substance. But I am interested in this moth-eaten appearance in the pelvis. It looks, in these air injections, as if there was a tongue like process hanging down into the pelvis, and the same tongue like lesion is evidently the dye filled pelvis subsequent to the intravenous pyelogram. You can see it quite definitely in both films, a fact that clearly demonstrates the value of air injection of the renal pelvis. I am not so much impressed with the filling defect in the region of the prostate. The bladder is moth-eaten and ragged and has the appearance of one that is obstructed and trabeculated. This defect may represent the prostate, a tumor—neoplasm of the bladder—or a blood clot but I do not believe it is either. I think it is probably prostate plus trabeculation. Although I am always looking out for pitfalls at these conferences, I shall hazard a

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26091

PRESENTATION OF CASE

A fifty-six-year-old man was admitted to the hospital complaining of painless hematuria.

The patient had enjoyed perfect health until one week before admission when for the first time he passed a large amount of bright-red blood in his urine. Following this he noticed a sharp non-radiating pain in the right flank, which lasted some twenty minutes and disappeared gradually without residual discomfort. He continued to pass blood in decreasing amounts for the next four days. For three days before admission, however, the urine was "dark," but no fresh, bright-red blood was noted. He had experienced no chills, fever, nocturia, frequency, urgency, dysuria or pyuria. He had lost no weight and had noted no other symptoms.

The patient had been in close contact with a brother, who had spent six months of the past year in a local sanatorium because of "weak lungs," and a niece, who had died of tuberculosis eight years before the patient's present illness. The remaining family, marital and past histories were negative.

Physical examination revealed a slender, well-developed man, who lay quietly in bed in no apparent distress. The teeth were carious. Examination of the heart, lungs and abdomen was not remarkable. The genitalia were negative except for the presence of a small, smooth, cystic mass in the globus major of the right epididymis. The rectal examination was negative. The blood pressure was 150 systolic, 80 diastolic.

The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 5,300,000 with 177 gm hemoglobin (photoelectric-cell technic), and a white-cell count of 19,000 with 78 per cent polymorphonuclears. The blood smear was negative, the platelets were normal. The urine was cloudy, amber in color and acid, with a specific gravity of 1.016 and a + albumin test. The sediment contained 40 to 150 red blood cells, 5 to 8 white blood cells and 2 epithelial cells per high-power field. The blood Hinton test was negative. The blood sugar and nonprotein nitrogen determinations were normal.

Culture of bladder urine showed a moderate growth of *Staphylococcus aureus* and an abundant growth of nonhemolytic streptococci.

Intravenous pyelograms showed that the kidneys were normal in size, shape and position. There were no visible stones. The intravenous dye appeared promptly and demonstrated normal urinary passages on the left. On the right side there was a sharply defined filling defect occupying the upper major calyx and upper portion of the renal pelvis. The lateral margin of the pelvis in this area showed a slight pressure defect, and there appeared to be slight spreading of the upper and middle calyces. The bladder showed a pressure defect in the region of the prostate. A right retrograde pneumopyelogram confirmed these findings. There was a definite intrapelvic filling defect of the right kidney, which was the same size and shape as that previously demonstrated by the intravenous pyelograms. The margins of this defect were slightly irregular, and it appeared to extend upward along the upper calyx of the kidney. The bladder was not demonstrated.

On the fifth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. J. DELLINGER BARNEY: The causes of hematuria are legion and we cannot go into all of them here. When we speak of painless hematuria we usually mean that there are no particular symptoms associated with it. This patient had right flank pain, and there are many causes, of course, for that. But we have to consider the possibility that this man had a tumor in this kidney, the pain being caused not by the tumor but by the formation and passage of large blood clots. Or he might have had an acute inflammatory disease of the kidney—I refer to carbuncle or multiple cortical abscesses. Or, he might have had a pyelonephritic abscess, or an acute hemorrhagic nephritis, in which, as Dr. Holmes and I recall very well, the findings may very strongly suggest those of a renal tumor. The fact that he had lost weight indicates it was not a long-standing process.

His association with two individuals who apparently had tuberculosis might throw some light on the question, but I do not believe it does in this particular case. With the story we have already heard and contact with these individuals, we have to consider the possibility of tuberculosis of the urinary tract. On the other hand, in my experience, renal tuberculosis does not produce massive hematuria or pain, and there is microscopic hematuria rather than gross.

The fact that the temperature, pulse and respirations were normal indicates there was no acute

systolic, 75 diastolic, and she began to vomit. Examination of the eyegrounds showed beginning choked disks. There were no signs of meningeal irritation at this time. Vomiting persisted for a week, despite the administration of intravenous glucose.

Ten days after the appearance of the puffy eyelids the blood nonprotein nitrogen was 81 mg per 100 cc., the serum protein 4.9 gm., and the cholesterol 191 mg. There was beginning pitting edema of the ankles and in the sacral region. Another lumbar puncture done two days later showed an initial pressure of 350 mm of water and 15 cc. of "ground glass" fluid was withdrawn. The fluid contained 1700 cells per cubic millimeter, 87 per cent of which were polymorphonuclears. The total protein was 46 mg per 100 cc., and the sugar 43 mg.

No organisms were seen in the smear.

At the end of thirty-eight days the temperature again rose to 104.0°F., but no further surgery was attempted. Vomiting persisted, there was some frontal headache, and the general condition did not appear to be very good. Subsequent lumbar punctures showed continued cloudy fluid under increased pressure, there appeared stiffness of the neck, bilateral Kernig signs and a Brudzinski sign, and the optic disks were markedly blurred. The urine showed a trace of albumin with 8 to 10 white blood cells per high-power field and a few casts. The white-cell count of the blood, which had ranged between 19,000 and 25,000, rose to 35,000 and then to 50,000. Cultures of the spinal fluid showed hemolytic streptococci on three occasions, and the spinal fluid sugar dropped to 16 mg per 100 cc. On the forty-first hospital day she had a generalized convulsion, became comatose and exhibited markedly irregular breathing. She died two days later, on the forty-third hospital day.

DIFFERENTIAL DIAGNOSIS

DR. THEODORE H. INGALLS This patient started off with a protracted and fatal illness with an acute otitis media following an upper-respiratory infection. The right drum ruptured spontaneously, was later incised, and continued to drain for two months, making the diagnosis of right mastoiditis presumptive if not certain. It is of merely passing interest that otitis media had occurred two and a half years before entry and that her tonsils and adenoids had been removed long before either infection. Whether "inflammation of the kidneys" a year before entry represented pyelitis, nephritis or simply a lay diagnosis I am unable to say.

She was admitted to the hospital with postaural tenderness, obviously related to mastoiditis on the

right. For the following week, during which she was studied and presumably x-rayed for signs of osteomyelitis, her condition remained substantially the same, with discharge persisting from the ear, a fever of 100.0 to 103.0°F and an elevated white cell count. Then there occurred a change to which I am inclined to attribute considerable significance. The temperature rose to 105.5°F and she vomited several times. Since this occurred before operation, and in fact must have been the main consideration leading to operation the same day, it seems likely that it represented a sudden extension of a septic process in the way of a phlebitis of the lateral sinus. In point of fact a definite phlebitis resulting from a perisinus abscess was found, and a hemolytic streptococcus cultured from the blood stream two days later. I am inclined to believe that the phlebitis dated from the first sharp temperature rise and that streptococci could likewise have been recovered from a blood culture taken at that time. Exactly when the patient picked up the streptococcus is difficult to say. I should suppose that it was in the ear and nasopharynx for some time and that the sudden temperature rise marked its invasion into the blood stream. One cannot help speculating as to whether a massive initial dose of sulfanilamide administered immediately after the temperature rise and prior to operation would have changed the end result—it is obvious that this case antedates the sulfanilamide era.

Three days after mastoidectomy and one day after ligation of the jugular vein, two other changes occurred which are suggestive, although perhaps misleading. A positive Kernig sign and a stiff neck were elicited in the face of a normal lumbar puncture, and "transient severe pain" occurred in the right hip. Since this child had a phlebitis that was feeding bacteria into the blood stream, these symptoms suggest metastases to a joint and to the central nervous system, well-recognized sites of predilection when extension does occur. However, no objective signs were later recorded that suggest involvement of the hip in a septic process, and the transient stiff neck might be related to dural irritation in the neighborhood of the lateral sinus.

From this time on the child maintained a high temperature with signs of continued infection as revealed by the appearance of a discharging ear on the left, although there was a generally favorable reaction to transfusion, with subsidence of the temperature by lysis to a little over 100.0°F.

Choking of the disks, which then occurred, may reflect an expanding intracranial lesion (abscess) or simply be a result of ligating the jugular vein.

Just eighteen days after the hemolytic streptococcus presumably reached the blood stream, and sixteen days after it had been demonstrated there, the patient developed puffy eyelids and gross hematuria. Although I at first considered pyelonephritis as seriously as glomerulonephritis, the clinical picture of the latter disease is so complete and its time relation—sixteen to eighteen days—to streptococcal invasion so characteristic as to make the latter diagnosis practically compulsory. I find a complicating nephritis in this patient particularly interesting in the light of recent work showing that streptococcal toxin endows homologous (and non-antigenic) kidney proteins with antigenic properties. This explains how a patient such as this might develop circulating antibodies against his own kidney tissue and is one theory as to the etiology of glomerulonephritis. The blood non-protein nitrogen was definitely elevated, and the serum protein just below the critical level—consistent with the pitting edema present clinically. These figures may have been and probably were influenced by anabolic and starvation processes, since it seems doubtful that an adequate food intake could have been maintained during this illness. Taken in conjunction with the urinary findings they suggest a mild renal insufficiency, which I do not believe constitutes uremia. The blood pressure was only slightly elevated, whether from the intracranial or renal disease I cannot say.

At the end of thirty-eight days the patient developed a terminal meningitis with spinal rigidity and marked choking of the disks. The temperature and white-blood-cell count rose markedly, the spinal-fluid sugar dropped to 16 mg per 100 cc, and streptococci were cultured on three occasions. I do not know whether this resulted from the extension of a brain abscess into the subarachnoid space—an unusual occurrence—or to direct extension of the septic process in the right mastoid region, which is more likely on the basis of chance.

The facts that some improvement was manifest after transfusion and that the white blood-cell count was maintained between 25,000 and 50,000 terminally again bring one back to speculate whether sulfanilamide administered when the phlebitis developed might not have proved of decisive therapeutic aid.

DR HAROLD L. HIGGINS *Streptococcus haemolyticus* meningitis following a mastoiditis usually occurs by extension extradurally from a perisinus abscess or intrapially from a neighboring metastatic brain abscess. At first the meningeal infection is localized, and the meningitis will frequently subside of itself, if the extrameningeal

pus is drained, unfortunately, it was not the case here.

The usual etiology of hemorrhagic nephritis is an acute hemolytic streptococcus infection fourteen to twenty-one days previously and chilling of the body within twenty-four hours, we have no history of chilling in this case. The occurrence of nephritis while the streptococcal infection is still present leads to a more persistent nephritis and a poorer resistance to the bacteria, we observe this here.

CLINICAL DIAGNOSES

Right otitis media, suppurative, acute, with mastoiditis
Lateral (right) sinus thrombosis
Acute nephritis
Meningitis

DR INGALLS'S DIAGNOSES

Otitis media chronic, right ear, acute, left ear
Osteomyelitis, right mastoid
Perisinus abscess, right lateral sinus
Thrombophlebitis, right lateral sinus
Meningitis, streptococcal
Brain abscess?
Glomerulonephritis

ANATOMIC DIAGNOSES

Acute meningitis, hemolytic streptococcus
Mastoiditis, acute and chronic, right
Otitis media, acute, left
Sinus thrombosis, both lateral sinuses, torcular and posterior portion of superior longitudinal sinus
Nephritis, acute glomerular
Septicemia, hemolytic streptococcus
Hydropéricardium
Ascites, slight

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY Dr Ingalls was quite correct in his surmise that this case antedated the sulfanilamide era. At the present time sulfanilamide would almost certainly have been given a trial and it is quite possible that the outcome would have been different. In fact the most notable difference attributable to chemotherapy in the material which reaches our autopsy table is the marked diminution in the complications of middle ear and mastoid disease.

The autopsy showed a diffuse seropurulent meningitis. Hemolytic streptococci were recovered on culture, and chains of cocci were readily visible microscopically in sections of the meninges. There was no cerebral abscess. Rather extensive granular thrombosis was found involving the pos-

terior half of the superior longitudinal sinus, the torcular and both lateral sinuses extending as far as the jugular foramen on the left side and to the region of the emissary vein on the right. The petrosal and cavernous sinuses were negative. There was still some persisting infection in a few mastoid cells near the posterior portion of the process. The left mastoid was negative, but the left middle ear contained frank pus. The ethmoid and sphenoid cells were negative.

The other important finding was the condition of the kidneys. They were greatly enlarged, weighing 400 gm, as against a cardiac weight of 150

gm. The cortices were something over a centimeter in thickness and appeared very pale, with scattered bright red petechiae.

On microscopical examination no normal glomeruli could be found. There were marked endothelial proliferation, considerable hemorrhage and fibrin deposit, and occasionally slight crescent formation. From the appearance of the kidneys I should guess that there had been a real uremia in the terminal stages. There was a moderate amount of fluid in the pericardium, this was faintly turbid, but there was no fibrin and a septic pericarditis could be excluded.

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WHAT IS OSTEOPATHY?

THIS question has been asked on numerous occasions recently in medical literature and the answers have been such that there appears to be a golden opportunity for some medical historian to write in objective fashion an account of the rise of this branch of the healing art. He should not be a historian who presents merely an aggregation of facts, but one who realizes that "it is by solidity of criticism rather by plenitude of erudition that the study of history steadies and straightens and extends the mind," and that "history rescues us from the temporary and the transient and compels us to fasten on abiding issues"

The method of treatment known as osteopathy began with the relief given to one patient and was then applied to others, with what relative success we shall never know for no failures were

reported, yet the true scientist thinks "error treated thoroughly nearly as remunerative as truth, by the discovery of new objections" From those inadequately studied cases, wide inductions were drawn concerning the origin or cause of disease and its treatment. The variations in the scope of the inductions are in part responsible for the variations in the definitions of osteopathy

Osteopathy is a mechanical and kinetic theory of disease, in that impairment of the rate of flow of nerve impulses—later views also included blood and lymph flow—is judged to produce disease. Such impairment occurs most frequently when bony structures are close to nerves, as along the spinal column, specifically at the points of emergence of nerve roots, but may occur in other parts of the body. Dislocations of the vertebrae, minimized for contemplation by the term subluxations, are the chief underlying etiologic factors

In the early enthusiasm, no other cause for disease was recognized or deemed necessary, and no method of treatment except corrective manipulation was applied. Thus, when early legislative recognition was given, it specified that the osteopath should not use drugs, nor should he perform surgical operations. This gives a general definition of osteopathy as a system of treatment: it is a system of corrective manipulation, without the use of drugs and without surgical operations. It is important to keep this fundamental idea in mind, and it is not necessary to ask at this point just what system of corrective manipulation it comprises

Throughout the years there has occurred a significant shift in thought on the part of many osteopathic physicians, with a breaking down of distinctions to the point of utter confusion. This is exemplified by the testimony in a recent court case in Kansas*. In that state there is one board of examiners issuing licenses "to practice medicine and surgery" and another granting those "to practice osteopathy." In the case referred to, the defendant, licensed by the second board, practiced medicine and surgery, which was held by the

*Osteopathy. As taught and practiced in the legally incorporated colleges of osteopathy of good repute. Constructed. Medicolegal Abstracts. Bureau of Legal Medicine and Legislation. J. A. M. 4: 113-447. 1939.

complainant to be a violation of the law. The defendant had received a certificate granting him the right to practice osteopathy in the state of Kansas, as taught and practiced in the legally incorporated colleges of osteopathy of good repute. It was suggested by him that osteopathy had abandoned its fundamental opposition to drug therapy and operative surgery, and now includes the use of these things in its system of healing. Furthermore, it is known that reputable schools of osteopathy include courses in these subjects in their curricula.

The court held that the osteopathic act did not authorize licentiates to use drugs in so far as such drugs are given as remedial aids, nor did it authorize them to practice in the general field of operative surgery with surgical implements, but limited them to manipulative surgery. Therefore the court ousted the defendant from the practice of medicine and surgery.

The significance of this incident from the point of view of the definition of osteopathy is that claims were publicly made by a representative osteopathic physician that osteopathy is what a school of osteopathy teaches and that a licentiate authorized to practice osteopathy is authorized by the Kansas law to practice drug therapy and instrumental surgical therapy, just because reputable schools of osteopathy have enlarged their courses of study to include these subjects. The rejection of this claim by the court is especially welcome because the phrase "as taught in a reputable school" constantly creeps into proposed legislation for branches of the healing art other than osteopathy, and it is often feared with some justification, that the proposed limits for the license might be gradually and quietly extended to cover a much larger field of practice than was claimed at first.

It may be said in conclusion, that regardless of whatever system of corrective manipulative procedures osteopathy may prove to be on investigation it has not changed its essence. If it does, it is no longer osteopathy, it becomes something else. It cannot adopt drug therapy or operative instrumental surgery. In a school of medicine in which someone teaches osteopathy, someone may

also teach drug therapy or instrumental surgery or even science. Of course, if the law permits, a graduate of an osteopathic school may use drugs if he sees fit, but no matter what any physician may do, osteopathy cannot adopt the principle of drug therapy.

The distinction is of no slight importance because efforts are ever in the making to cloud the issue, to misrepresent solidity of criticism as partisan persecution, and always, always, to avoid facing the facts.

CHILD ADOPTION

A RECENT article on adoption by Dr Douglas A. Thom¹ is well worth consideration, and is of particular interest when considered together with a similar paper by Dorothy Thompson² published only a few months previously. One article is fundamentally scientific and appropriately cautious, and the other is distinctly emotional in its appeal, but both arrive at the same basic conclusion.

As stated by Dr Thom, the conclusion is that the problem at the moment is not one of getting the perfect child into the perfect home, but rather the broad, sociologic problem of bringing together the largest number of acceptable children and the largest number of acceptable homes, with the objective of increasing the sum total of the satisfactions to be derived by both adoptive parent and child, and with the minimum amount of risk of creating incompatible relationships."

Adoption is obviously a serious business. With this in mind there is a tendency on the part of certain adoption agencies so to safeguard the interests of both child and prospective parents that the difficulties and delays often seem insuperable. It would appear, indeed, to the casual observer that the requirements for adoption are based on considerably higher standards than would obtain for natural children in decent if not *de luxe* strata of society.

As Dr Thom further says, the problem of bringing together the largest number of acceptable homes and the largest number of acceptable children cannot be satisfactorily settled unless care

ful investigations are carried out by a group of trained investigators who will determine the obvious reasons why an adoptive procedure would not be successful. From such an investigation could be determined the "reasonable liabilities which must be assumed by both adoptive parents and adoptive child, comparable to the liabilities that invariably occur in the natural parent-child relationship."

In determining the risks involved, it must be remembered that the adoptive parents must make many adjustments. The decision for adoption comes as the result of one or more reasons, which may be carefully considered or may be largely emotional. Perhaps usually an excess of the maternal instinct is at work, perhaps the adoption is decided on from a deep-seated sense of duty, perhaps it is used as the last means of saving a marital situation. In any event the motives are apt to be mingled, and the psychological setup is quite different from that which exists in the natural relationship.

As a matter of fact, most adoptions appear to be highly successful arrangements, and it is pertinent for both Dr. Thom and Miss Thompson to raise the query as to why there should not be more of them. Miss Thompson rightly decries the policy, now happily becoming outdated, of sending illegitimate parent and illegitimate child into the world together to share their mutual woe. She shows, unfortunately, a lack of familiarity with some of the real problems associated with the procedure of adoption.

Also of considerable timely interest in this subject, and emphasizing the necessity for careful investigation before adoption, is the recent exposé² of certain baby-selling maternity homes. In these both the unmarried mother and the adopting parents are mulcted until the law occasionally catches up with the racket and forces it at least to change its place of business.

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MEDICAL EPONYM

BEARD'S DISEASE

A paper entitled "Neurasthenia or Nervous Exhaustion," which was read by George M. Beard (1839-1883), then lecturer on nervous diseases at the University of New York, before the New York Medical Journal Association, led to the designation of this condition by the name of its author. The article may be found in the *Boston Medical and Surgical Journal* (80:217-221, 1869).

The morbid condition or state expressed by this term has long been recognized, but the special name *neurasthenia* is now, I believe, for the first time presented to the profession.

I have for some time been in the habit of employing the term *neurasthenia* to express the morbid state that is commonly indicated by the indefinite phrase, nervous exhaustion.

The derivation of the term *neurasthenia* is sufficiently obvious. It comes from the Greek, and being literally interpreted signifies want of strength in the nerve.

In regard to the pathology of *neurasthenia* we are compelled, in the absence of definite knowledge, to reason from logical probability.

My own view is that the central nervous system becomes dephosphorized, or, perhaps, loses somewhat of its solid constituents, probably also undergoes slight, undetectable, morbid changes in its chemical structure, and, as a consequence, becomes more or less impoverished in the quantity and quality of its nervous force.

Among the special exciting causes of *neurasthenia* may be mentioned the pressures of bereavement, business and family cares, parturition and abortion, sexual excesses, the abuse of stimulants and narcotics, and civilized starvation, such as is sometimes observed even among the wealthy orders of society, and sudden retirement from business.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

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The following have been selected by the president, Dr. Walter G. Phippen, to serve on the Committee to Study Proposals for Budgeting the Costs of Medical Care: Dr. Thomas H. Lanman, of Boston, chairman; Dr. John M. Birnie, of Springfield; Dr. James C. McCann, of Worcester; Dr. Michael A. Tighe, of Lowell; and Dr. Shields Warren, of Boston. The president, Dr. Phippen, and the secretary, Dr. Alexander S. Begg, are members ex officio.

SECTION OF OBSTETRICS
AND GYNECOLOGY*RAYMOND S. TITUS, M.D. *Secretary*
330 Dartmouth Street
BostonPUERPERAL SEPSIS TREATED
WITH SULFANILAMIDE

Mrs. E. O., a twenty-year-old para II, about thirty-six weeks pregnant, entered the hospital because of discomfort on November 22, 1938. Labor had not commenced.

The family history was essentially negative. She had had measles and whooping cough, the tonsils and adenoids were removed at the age of four, she had had a mastoid operation at the age of five. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted three to four days. Her last period had begun on March 9, making the expected date of confinement December 16. The previous pregnancy terminated in a low forceps delivery with a normal convalescence. The present pregnancy had been normal.

On admission the temperature was 100.0°F., and the pulse 114, regular and of good volume. She was not conscious of being ill and did not appear to be ill. The blood pressure was 120 systolic, 80 diastolic. The heart sounds were regular and clear, there were no murmurs. The lungs showed good resonance and were clear throughout. The abdomen was enlarged to a size corresponding to the dates. The fetus was in an ROP position, and the fetal heart rate was 132, the sounds being clear and regular. Rectal examination showed a lightly engaged head and a cervix that was not taken up. The pelvis was of the gynecoid type, slightly contracted. The urine examination was negative. A blood Wassermann test was negative.

On November 23, after a twelve-hour labor, the patient was delivered normally of a female child, weighing 5 pounds, 10 ounces. The placenta separated promptly and was expressed intact. The uterus contracted well. The temperature, however, remained elevated through labor, subsequently rising to 101.2°F., with a slightly elevated pulse. The temperature remained at about 101.0°F., and on the evening of November 24 it rose to 104.0, with a pulse of 124 which was of good quality. The fundus was slightly tender. The lochia was not foul.

Blood examination showed a hemoglobin of 75 per cent, a red-cell count of 4,240,000 and a white cell count of 17,400. The patient was given 40 gr. of sulfanilamide, with an equal amount of sodium bicarbonate, in divided doses on November 24,

the same amount on November 25, and 20 gr. on November 26.

The temperature dropped abruptly to normal the morning of November 25, but rose to 103.4°F. in the evening, then it began a gradual decline, reaching normal on December 1. Because of the marked improvement, the patient received no medication after November 26.

She was discharged from the hospital on December 6, with the uterus in good position and well involuted, the vaults clear and a very slight discharge.

Comment. The marked improvement following the use of sulfanilamide is probably an indication that the infection was caused by a hemolytic streptococcus, although there were no blood or uterine cultures to prove or disprove this statement. This patient undoubtedly had the infection when she started in labor, and whether it came from the uterus or from some other source was not determined.

MEDICAL POSTGRADUATE
EXTENSION COURSES

The following sessions of the Medical Postgraduate Extension Courses have been arranged for the week beginning March 3.

BARKSHIRE

Thursday March 7 at 4:30 p.m. at the Bishop House of Mercy Hospital Pittsfield. Common Problems of Neurology. Indications for lumbar puncture. Instructor T. J. C. von Storch. Harry G. Melton, *Chairman*.

BRISTOL SOUTH (Fall River Section)

Tuesday March 5 at 4:30 p.m., at the Union Hospital Fall River. Gonorrhea in the Female. Instructor Oscar F. Cox, Jr. Howard P. Sawyer, *Chairman*.

FRANKLIN

Thursday March 7 at 8:15 p.m., at the Franklin County Hospital Greenfield. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor Ashton Graybiel. Halbert G. Stetson, *Chairman*.

HAMPSHIRE

Thursday March 7 at 4:00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield and at 8:15 p.m., in the Outpatient Department of the Skinner Clinic Holyoke Hospital Holyoke. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor Samuel A. Levine. George L. Schadt, *Chairman*.

HAMPSHIRE

Thursday March 7 at 4:15 p.m., in the Nurses Home of the Cooley Dickinson Hospital Northampton. Convulsions in Infants and Children. Etiology and treatment. Instructor R. Cannon Eley. Warren P. Cordes, *Chairman*.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

MIDDLESEX SOUTH

Tuesday, March 5, at 4 30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Pneumonia Instructor Chester S. Keefer Dudley Merrill, *Chairman*

NORFOLK

Thursday, March 7, at 8 30 p.m., at the Norwood Hospital, Norwood. Complications in Obstetrics, Illustrated by Case Histories Instructor John Rock Hugo B. C. Riemer, *Chairman*

NORFOLK SOUTH

Monday, March 4, at 8 30 p.m., at the Quincy City Hospital, Quincy. Indications for Cesarean Section Instructor M. V. Kappius David L. Belding, *Chairman*

PLYMOUTH

Tuesday, March 5, at 4 00 p.m., in the Nurses' Home of the Brockton Hospital, Brockton. Syphilis in Pregnancy and the Offspring Instructor Rudolph Jacoby Walter H. Pulsifer, *Chairman*

SUFFOLK

Thursday, March 7, at 4 30 p.m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. Head and Spine Injuries Instructor Donald Munro Reginald Fitz, *Chairman*

DEATHS

CUSHMAN—ANDREW B. CUSHMAN, M.D., of South Dartmouth, died February 13. He was in his eighty-fifth year.

Born in Freetown, Massachusetts, he attended the University of Vermont and received his degree from the University of Vermont College of Medicine in 1886.

Dr. Cushman was a fellow of the Massachusetts Medical Society and the American Medical Association, and was a member of the New Bedford Medical Society.

A son and a daughter survive him.

KELLEY—JOSEPH H. H. KELLEY, M.D., of Dorchester, died February 18. He was in his sixty-fourth year.

Born in Boston, he graduated from Tufts College and received his degree from Tufts College Medical School in 1898.

Dr. Kelley was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, a daughter and a sister survive him.

MURRAY—GEORGE A. MURRAY, M.D., of South Boston, died January 21. He was in his fifty-sixth year.

Born in Boston, he attended Boston College and received his degree from Harvard Medical School in 1915. For several years before and after the World War he was associated with the Mayo Clinic in Rochester, Minnesota. He was a former member of the Massachusetts Medical Society and the American Medical Association.

His widow, a daughter, a son, a brother and a sister survive him.

PEIRCE—GEORGE A. PEIRCE, M.D., of Enfield, New Hampshire, died February 21. He was in his sixty-sixth year.

Born in Boston, he attended Boston Latin School and received his degree from Harvard Medical School in 1898. Dr. Peirce was formerly the assistant superintendent at the

Massachusetts State Infirmary at Tewksbury, but retired five years ago.

He was a member of the Massachusetts Medical Society, the American Medical Association and the New England Society of Psychiatry.

A son and a daughter survive him.

VICKERY—HERMAN F. VICKERY, M.D., of Brookline, died February 22. He was in his eighty-fifth year.

Born in Rochester, New York, he attended Harvard University and received his degree from the Harvard Medical School in 1882. He studied at the University of Leipzig and also served in the Vienna General Hospital. He began practice in Boston and became an instructor of clinical medicine at the Harvard Medical School. Dr. Vickery was physician to the outpatients at the Massachusetts General Hospital from 1885 to 1898, and visiting physician from 1898 to 1914, when he was appointed to the consulting board.

He was a fellow of the Massachusetts Medical Society and the American Medical Association, and was a member of the Boylston Medical Society and the Association of American Physicians.

His widow, two daughters and a son survive him.

MISCELLANY

MAINE NEWS

NEW LICENSEES

The Board of Registration of Medicine lists the following physicians as licensed through examination, as of November 15, 1939:

Karl V. Anderson, M.D. (Tufts '39), Lewiston.
 Samuel Bachrach, M.D. (Tufts '38), Worcester, Massachusetts.
 Kenneth C. Banting, M.D. (Western Ontario '32), Elnora, New York.
 Henry A. Brann, M.D. (Boston University '39), Augusta.
 Dexter Clough, 2nd, M.D. (Pennsylvania '39), Bangor.
 Paul E. Floyd, M.D. (Harvard '39), Portland.
 Norman Jackson, M.D. (Albany '39), Lewiston.
 John C. Myer, M.D. (Hahnemann '39), Providence, Rhode Island.
 Helen Provost, M.D. (Boston University '35), Augusta.
 William D. Reid, M.D. (Harvard '09), Newton, Massachusetts.
 John E. Smith, M.D. (Vermont '37), Brooklyn, New York.
 Cornelia B. Walker, M.D. (Columbia '34), Portsmouth, New Hampshire.
 Thomas B. Walker, M.D. (Columbia '33), Portsmouth, New Hampshire.

The following were licensed through reciprocity:

Wilfred J. Comeau, M.D. (Harvard '33), Boston.
 Bernard Diamond, M.D. (Edinburgh '37), Brooklyn, New York.
 Henry B. Finks, M.D. (Vermont '37), Portland.
 Byron M. Harman, M.D. (Pennsylvania '17), Verona, New Jersey.
 Milton S. Thompson, M.D. (Harvard '31), Boston.

REMOVAL NOTICES

The following removal notices have been received:

W. H. Kelly, M.D., from Biddeford to Waterboro.

- L. A. Parella M.D., from Lewiston to North Haven Connecticut.
 G. W. R. Bowie, M.D., from Rangeley to New Gloucester.
 R. E. Williams, M.D. from New Gloucester to Freeport.
 E. D. Humphreys, M.D., from Jackman to Pittsfield.

MAINE MEDICAL ASSOCIATION

The following physicians have been recently admitted to membership in the Maine Medical Association

- Gordon N. Johnson, M.D., Portland.
 Philip Gregory M.D., Boothbay Harbor.
 Clarence J. Kenney M.D., Togus.
 Herbert T. Clough, Jr., M.D., Bangor.
 Richard T. Munce, M.D. Bangor.
 Walter L. H. Hall M.D., Old Town.

RHODE ISLAND NEWS

WALTER LEE MUNRO

We think of the late Dr. Walter Lee Munro not only as a great doctor but as a great man—a dynamic and truly unique personality.

Born in Bristol, Rhode Island, in 1857 he came of old Pilgrim stock. Educated in the Bristol schools, he took his A.B. degree at Brown University in 1879 and his M.D. at Harvard University in 1885 and practiced his profession in Providence until the very day of his death. As surgeon to the Rhode Island Hospital and consultant to many other hospitals in Providence and throughout Rhode Island and as a private physician with a large practice among people of all nationalities, creeds and social statuses he served his community well for over fifty years.

Strong but gentle, wise but simple, devoted to his family but sacrificing his personal comfort to the demands of his practice, ever alive to the growth of medical art and a close student of its expanding literature, applying practically what he heard saw or read, treating his patients in and out of hospitals, as people, not subjects, he fulfilled well our ideal of the "perfect doctor." He wrote many creditable medical papers and reports, also many fascinating monographs on lay subjects bearing on the past of his alma mater—Brown University,—the last of these appearing only a month before his death.

A great reader he retained with clear-cut memory what he read, as also the events of his own long and varied career. An athlete and hunter a world-wide traveler a bon vivant, he was, more than all, a friend. Friendship and friendliness were perhaps the outstanding characteristics of this doctor who loved and was loved by the world. He just could not help being friendly and hospitable. Partial deafness as well as blindness were his lot in later years, but he simply would not let them "get him," and carried on to the last.

In his death Dr. Munro leaves with us a fine sense of generous manhood which looked out not in. He was a man, healthy in body mind and spirit, whose passing, young at eighty-two, finds the world better for his having lived.

H. DE W.

NOTE

Dr. Chester S. Keefer, associate professor of medicine, Harvard Medical School and junior visiting physician and director of the Second and Fourth Medical Services, Bos-

ton City Hospital gave the annual Henry Sewall Memorial Lecture of the Medical Society of the City and County of Denver on January 30. The title was "Hemolytic Streptococcus Infections. Their importance in acute and chronic disease."

CORRESPONDENCE

MASSACHUSETTS DENTAL SOCIETY

To the Editor: A most cordial invitation is extended to the members of the Massachusetts Medical Society to attend the evening program of the Massachusetts Dental Society which will be held in the Georgian Room, Hotel Statler Boston, on Wednesday April 24 at eight o'clock. Dr. Eben J. Carey, dean of Marquette University School of Medicine, Milwaukee, Wisconsin will speak on "The Mutual Co-operation in National Health by the Public and the Profession in Medicine and Dentistry." Dr. Walter G. Pluppen, president of the Massachusetts Medical Society will speak on "The Attitude of Organized Medicine in Regard to Socialized Medicine."

WILLIAM H. GRIFFIN, President
 Massachusetts Dental Society

106 Marlborough Street,
 Boston.

REPORTS OF MEETINGS

GREATER BOSTON MEDICAL SOCIETY

A regular meeting of the Greater Boston Medical Society was held at the Beth Israel Hospital on December 5 with Dr. Max Ritvo introducing Dr. Emil Novak, of Baltimore, who spoke on "Gynecologic Endocrinology and Organotherapy." In view of the fact that intelligent organotherapy must follow a fundamental knowledge of the underlying endocrinology the speaker first reviewed the physiology of menstruation. He discussed the production of the estrogens, which persist throughout the cycle, by the ripening follicles and that of progesterone which occurs only in the second half of the cycle, by the corpus luteum.

Dr. Novak then summarized the physiologic effects of the so-called sex hormones. The estrogens, which are much more universally distributed than progesterone, were described as being fundamentally growth hormones with selective activity on the Mullerian system. Thus, they are responsible for an increased blood supply and maturation of the reproductive tract. They also cause the rhythmic contractility of the uterine musculature and proliferative changes in the breast and are instrumental in the development of secondary sexual characteristics. The best examples of this in the human being are the results observed in functioning endocrine tumors before puberty and after the menopause.

Progesterone on the other hand, is a much more specific hormone, which appears to be present only following ovulation. Its effect is produced only on endometrium already primed by estrogen and results in the secretory phase, with its increased glycogen content. Indeed, the appearance of the endometrium after the combined action of the two hormones so closely resembles the early decidual reaction of pregnancy that the two conditions are differentiated only with difficulty on that basis alone. It was pointed out that since the corpus luteum is in reality merely a metamorphosed follicle, the close similarity in chemical structure of the two hormones is not surpris-

ing Further work has served to divide the nebulous "internal secretion of the ovary" into a group of crystalline compounds

Dr Novak then discussed the non pelvic origins of hormones that affect the reproductive organs. He cited the well known experiments, since the first description of Frohlich's syndrome, which have resulted in the hypothesis that the pituitary gland, through its gonadotropic hormones, probably has a governing role. The evidence for two separate tropic substances is now almost incontrovertible, one (FSH) stimulates the maturation of the follicle and the other (LSH) causes the luteinization of the ripe follicle. Unfortunately there has been no isolation of either substance of proved purity or measurable activity. Recent experiments, however, seem to indicate that the gonadotropic substance isolated from the urine of pregnant mares is efficacious as a follicle stimulating hormone.

Another source of physiologically active sex hormones is the urine of pregnant women, which contains anterior-pituitary-like substances (APL) rather than true overflow pituitary hormones. There are also two distinct endocrines here, sometimes called the prolans. Their origin is now proved by tissue culture, as well as by physiological experiments, to be in the trophoblastic shell of the implanted ovum. Any living, active trophoblast with access to the maternal circulation is capable of producing these substances, which Dr Novak suggested should be called chorionic hormones. These prerequisites for their presence in the maternal blood explain why a positive Aschheim Zondek test is usually found in cases with chorionepithelioma and why a negative test may be encountered in an inactive tubal pregnancy.

The final substance employed in female organotherapy is testosterone propionate, one of the androgenic principles which is closely allied structurally to progesterone and the adrenal hormone, desoxycorticosterone. Although the results are still controversial, the effect of testosterone on the endometrium appears to be one of antagonism to estrogen during the first half of the menstrual cycle and of supplementation to progesterone after ovulation.

Dr Novak then proceeded to a discussion of organotherapy in various female endocrinopathies. The first consideration was that of functional uterine bleeding, which may be such a plague especially at puberty and the menopause. Dilatation and curettage may often check the condition only temporarily, if at all, and patients have been known to go on to exsanguination during such episodes. The cause of the disorder may be primarily one of ovarian dysfunction, due either to the persistence of an unruptured follicle or to the continued development of more than one follicle. The speaker warned that, in the evaluation of any therapy, this disorder is notorious for its spontaneous remissions and self-limited course. The treatment should consider the phase of the reproductive life of the patient and the desire for children. A complete physical examination and a diagnostic dilatation and curettage should always be carried out in order to rule out organic disease as a cause of the metrorrhagia. At the time of the menopause, the use of radium rather than surgery was recommended unless there was some other indication for laparotomy.

In regard to the hormones, the results in no instance proved conclusively that they were of benefit, but Dr Novak said that sterilization procedures were too radical in the child-bearing age without a previous attempt at conservative treatment. The various progesterone and prolan products should probably be given only at the time of bleeding, after determining that it is not a true menstrual period. Occasionally there is marked alleviation of

symptoms and occasionally none, while usually there is moderate relief. Testosterone should probably be administered throughout the cycle after sufficient control periods have been observed. This more frequently gives favorable results, but in large doses may occasionally result in slight and transient masculinization. Its mechanism was postulated as an inhibition of estrogen through the anterior pituitary gland.

In the treatment of metrorrhagia at puberty, Dr Novak emphasized the desirability of advising the mother of the protracted period of adjustment which often occurs before a spontaneous termination of the condition occurs. If organotherapy fails, repeated dilatations and curettage should be attempted, with radium implantation being reserved only as a last resort. The speaker made the pertinent suggestion that in any case necessitating transfusion, a donor should be selected, if possible, who is three to four months pregnant.

In opening the discussion, Dr Joseph C. Aub emphasized the importance of an evaluation of the substrate in any undertaking with organotherapy. This is particularly important in those transition periods of puberty and the menopause. In the former phase there is a crescendo development of the gonadal hormones and the substrate is more susceptible to substitution therapy than in the menopausal patient with her decadent hormonal system. Dr Aub asked Dr Novak's views on dysmenorrhea.

The discussion was continued by Dr Max Davis, who warned of the potential dangers in these therapeutic agents and cited cases of masculinization following the use of even small doses of testosterone. He asked Dr Novak whether he considered it possible to find the secretory phase in an endometrial biopsy from a patient who had not ovulated.

Dr Samuel L. Gargill was of the opinion that most patients with metropathia hemorrhagica are subnormal physically and nutritionally, particularly in respect to vitamins. In those who have a large leathery thyroid gland similar to that of thyroiditis, and who have a low basal metabolic rate, it has been found beneficial to use thyroid therapy.

Dr Novak closed the meeting with a discussion of the problems presented by these men. He was entirely in accord with Dr Aub in regard to the importance of the substrate in causing variable results in organotherapy. In regard to dysmenorrhea, the speaker said that, in certain cases resulting from hypercontractility of the uterus, progesterone might prove helpful through its antagonistic effect on estrogen. This was suggested by its beneficial effects in certain instances of threatened and habitual abortion. He added that there are a certain number of young asthenic girls under the spell of a doting mother whose threshold can be sufficiently elevated by physical and psychical development. The small residue of healthy bodies and minds in whom intelligent organotherapy has failed are the only patients whom Dr Novak considers worthy of presacral ganglionectomy. Exhaustive attempts at conservative treatment in such cases should include all the antiestrogenic hormones—progesterone, testosterone and the various anterior pituitary like substances.

In answer to Dr Davis, the speaker expressed the opinion that the secretory endometrium follows only ovulation, despite suggestive work of Hisaw which showed prosecretory granules in castrated monkeys treated with estrin. He said that the results of Hamlin, who found pregnandiol at periods other than those following ovulation, were probably due to faulty technique.

Dr Novak stated that postmenopausal endometrial hyperplasia could be explained on the persistence of some

estrogenic function following the cessation of external agents. The other hypotheses question the possibility of metabolizing sterols, and more recently point toward the adrenal cortex as the possible site of stimulation in such states.

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on December 12, 1939.

The first case was that of a forty-nine-year-old Viennese diamond setter who had entered the hospital four months previously with a history of increasing nausea, vomiting and exhaustion appearing in that order over a period of eighteen months. Physical examination revealed an emaciated man with pigmentation of the skin of the exposed surfaces in the axillae and of the genitalia and of the mucous membranes. The blood pressure was 100 systolic, 60 diastolic. A tentative diagnosis of carcinoma of the stomach, with a question of Addison's disease, was made. During his stay in the hospital he collapsed during an x-ray examination, when his blood pressure was found to have a systolic value of 70. Recovery followed the intravenous administration of sodium chloride solution. The serum chloride content ranged from 585 to less than 580 mg. per 100 cc. Urine and sputum specimens each showed acid-fast bacilli only once and then on the same day. X-ray examination of the chest showed no evidence of pulmonary tuberculosis or of calcified lymph nodes in the abdomen. A sodium chloride deprivation test resulted in acute illness, and relief was afforded by the administration of that substance. A diagnosis of Addison's disease was made, and the patient was put on a regimen of the standard high-salt, low-potassium diet with an additional 10 gm. of sodium chloride daily. Daily intramuscular injections of 10 and later 5 mg. of desoxycorticosterone acetate were given while the patient was in the hospital. He was discharged greatly improved at the end of three months, and was told to return about every three days for injections. The present return to the hospital was for the implantation of desoxycorticosterone pellets, computed to yield a daily dose of 1 or 2 mg., which had been determined as the patient's approximate maintenance requirement. There has been a moderate decrease of the general pigmentation but areas of increased pigment at the site of the intramuscular injections were noted.

Dr. Soma Weiss, in discussing the case, stated that the latter phenomenon was undoubtedly due to the increased transport of melanin to the hyperemic area caused by the trauma attendant on the injections. He called attention to the unusually low urinary androgen levels persistently found in this patient, who also complained of decreased libido. The question was raised as to the possibility of elevating the level and improving the associated symptoms with the specific substitution therapy employed. In reply to Dr. William C. Quimby's query as to whether the patient was considered to have tuberculosis, Dr. Weiss stated that it is now questionable whether the chronic destruction observed in the adrenal glands of these patients is actually tuberculous in nature. True tubercles, he said, are not found in this condition. Dr. Joseph C. Aub, in elucidating the problem of the urinary androgen secretion, stated that it was becoming generally accepted that the source of these substances is undoubtedly the adrenal gland and that an inhibition of libido is common.

The second case was that of a seventy-two-year-old man who had had for the past year a dull aching epigastric pain occasionally radiating to the shoulder blades, unassociated with meals, usually occurring during the night, and

relieved to some extent by alkalies and vomiting. Lately the pain had increased in severity and there had been occasional coffee grounds vomitus. There was moderate exertional dyspnea, and minimal ankle edema. Six months prior to entry an x-ray examination showed a questionable ulcer. On admission the blood pressure was 180 systolic, 110 diastolic; there were crackling basal rales and a slightly tender epigastrium. When the patient was unable to take a Sippy diet due to persistent vomiting, Wangensteen drainage was instituted but the patient appeared to be going downhill. The stools were strongly positive for occult blood and the red-cell count fell from 3,400,000 to 2,200,000. Surgery was not considered because of the rales, a fever of 101 F and the x-ray findings of an early bronchopneumonia. After several blood transfusions and the administration of a considerable quantity of parenteral nutrition and electrolytes, the patient improved and was able to tolerate a fourth week Sippy diet. The serum protein under the above therapy increased from 4.2 to 5.4 gm. per 100 cc., and a laparotomy was performed. At operation there was a small benign ulcer of the duodenum with marked spasm and a posterior gastroenterostomy was performed.

Dr. Elliott C. Cutler discussed the problems entailed in this case. In an elderly person one is too prone to consider all such lesions malignant rather than benign, but on the whole it is a healthy attitude if one does not balk at operation when there is some indication for it. He emphasized the improvement in preoperative management brought about in recent years, which proved so beneficial in this patient. The importance of the maintenance of the electrolyte balance in cases with vomiting and gastric drainage and of the serum protein level in those with starvation were stressed.

The speaker of the evening, Professor A. Baird Hastings, was introduced by Dr. Weiss. His subject was "Tissue Electrolytes." Dr. Hastings stated that the introduction of new techniques of study and an improved interpretation of results had merely served to bring closer together the observed values and those expected from an application of the Gibbs-Donnan and other physicochemical laws to the electrolytes of body fluids. These laws do not describe the behavior of tissue electrolytes, however. It was pointed out that analytical data were difficult to obtain for there are several kinds of tissue and cells cannot be maintained for long in the absence of their natural environment.

As a result of experiments it has been shown that the tissues and fluids of the body may be classified as systems of different permeabilities. A membrane permeable to anions and cations, but not protein—the capillary wall—could not obtain in tissues without a progressively increasing intracellular pressure, which is not true except in unusual cases and after death. Blood cells are permeable only to anions of small dimension and to water. Tissues in general are normally impermeable both to anions and cations and permeable only to water and un-ionized molecules.

One of the important findings of Dr. Hastings and his co-workers was the striking resemblance in ionic content of tendon to plasma rather than to muscle. In fact the extracellular phase of tissue was found to be much more like that of diluted connective tissue than of an ultrafiltrate.

Studies on experimental edema with an isotonic solution showed the extracellular swelling to be much greater in an alkaline than in an acid or normal medium. There was also some swelling of the cells in an acid or alkaline medium while dehydration occurred largely in the cellular phase.

HOUSE OFFICERS ASSOCIATION, BOSTON CITY HOSPITAL

At a regular meeting of the House Officers Association of the Boston City Hospital in the Cheever Amphitheater on December 13, 1939, Dr Richard B Cattell spoke on "Malignancy of the Large Bowel"

In introduction Dr Cattell alluded to the great improvement which has taken place in the surgical treatment of these conditions and attributed this largely to a better evaluation of the patients and an improvement in the pre-operative management of the cases. He stated that refinements in technic have been less important.

A tabulation of the Lahey Clinic cases of cancer of the large bowel revealed that about 60 per cent of the lesions occurred in the rectum and 40 per cent in various parts of the colon. Only 39 per cent of lesions in the latter location occurred in men, whereas the incidence in the rectum was 56 per cent. The sex incidence in the entire group, therefore, was about equal when due account was taken of the predominance of rectal lesions. In regard to age distribution, it was noted that the percentage of cases occurring in old age—sixty to seventy-nine—was larger in the colonic than in the rectal group. On the other hand, 16 per cent of the large bowel cancers occurred in those under thirty-nine years of age. Rectal lesions were most frequent from forty to sixty years.

Dr Cattell then briefly discussed methods of diagnosis. An illustration of the inadequacy of most such procedures is the fact that 30 per cent of patients with cancer of the large bowel have hemorrhoids and 15 per cent of all patients have had operative treatment of this condition within six months of the time of examination. The speaker stated that the protean and non-specific character of the symptoms usually prevents an accurate diagnosis by the history alone, but should always serve to arouse suspicion and lead to a thorough examination. In regard to the physical findings, Dr Cattell stated that 50 per cent of colonic carcinomas present palpable, abdominal masses, while 54 per cent of the rectal lesions are within reach of the examining finger in a properly conducted examination. The lithotomy position, even in men, was considered the optimum one.

Proctoscopic examination should be carried out in any suspicious case. An adequate preparation is especially desirable when there are polyps, which Dr Cattell stated occur in almost 3 per cent of the patients. A biopsy may be taken but a negative report by the pathologist should not be given preference over the entire clinical picture, for the superficial portions of malignant adenomas frequently fail to show evidences of cancer. Such endoscopic studies, in addition to a careful physical examination, enable one to make a diagnosis in 75 per cent of the cancerous lesions of the sigmoid and rectum.

Barium and double-contrast enemas should be employed in all suspected cases before ruling out cancer. A certain number must be subjected to laparotomy in the face of negative evidence in all these tests, purely because of a suggestive history. Although 50 per cent of these explorations will be negative, 1 per cent of all cancerous lesions of the large bowel cannot be demonstrated by any diagnostic procedure except exploratory laparotomy.

Dr Cattell enumerated the early symptoms suggestive of large-bowel cancer. Rectal lesions are prone to have bleeding, discomfort due to tenesmus, and a change of bowel habits, whereas colonic lesions present a change of bowel habits, anemia, and blood and mucus in the stools. Abdominal cramps are present in only 7 per cent of the rectal and sigmoidal carcinomas as compared with 80 per cent of those of the colon. The incidence of abnormal

stools decreases from 86 per cent in the lower lesions to 46 per cent in the left colon to 9 per cent in the right colon.

Before discussing the methods and results of treatment the speaker alluded to the rapid strides made in recent years in the number of so-called operable cases. Whereas only 48 per cent of those seen between 1922 and 1924 were considered operable, the percentage for the past two years has risen to 89 per cent of all diagnosed cases of large bowel cancer. These cases were no more favorable than formerly, for this is one group of neoplasms whose delay in treatment still continues. Approximately 10 per cent had liver metastases, many of which, however, were not massive. An additional number have their lives prolonged and the majority have their symptoms alleviated to varying degrees. This lack of selection has naturally decreased the percentage of favorable results and cure, but the presence of a few five-year "cures" in ostensibly inoperable patients has made the procedure definitely worthwhile.

During this same ten-year period when the operability has increased almost 100 per cent, the operative mortality has dropped from 36 per cent to 10 per cent for all types of operations. About 6 to 7 per cent of the patients require some type of enterostomy for obstruction, and a cecostomy is usually employed. The operations of choice in the colonic region are a modified Mikulicz procedure, with no intraperitoneal anastomoses, or a two-stage anastomosis and resection. Procedures carried out for rectal and rectosigmoid cancer are more flexible and vary with the case. Abdominoperineal resections in one or two stages are the commonest, with the latter type having been perfected and used extensively. Other types of operations in this region are loop colostomy and perineal resection, and abdominal resection with a permanent colostomy. The gross salvage in carcinoma of the rectum has been 54 per cent and of the colon 44 per cent for all resected cases.

Dr Cattell also discussed the difficult problem of polyps, with particular reference to the reputedly precancerous, congenital, adenomatous polyps. Single polyps were considered best treated by fulguration through the sigmoidoscope or by sigmoidotomy or colotomy if beyond reach. In the congenital form, all lesions in the rectum are best fulgurated, and an adequate colectomy and ileosigmoidostomy should follow.

Dr E. E. O'Neil stated that he preferred a primary aseptic anastomosis on right-sided colonic lesions rather than a Mikulicz procedure, on the basis that the former was at least as safe and was better economically for the patient. Dr Cattell stated that at the Lahey Clinic the Mikulicz type of operation proved to be the safest procedure, and concluded with the statement that any proved procedure familiar to the individual surgeon may give essentially the same percentage of favorable results.

NOTICES

PETER BENT BRIGHAM HOSPITAL

A research conference of the medical staff of the Peter Bent Brigham Hospital will be held in the amphitheater of the hospital on Tuesday, March 5, at 5 00 p.m. Tea will be served at 4 30 p.m.

PROGRAM

Blood and Urine Iodine in Diabetes Insipidus Dr. H. H. Blotner and H. J. Perkins
Further Observations on Dynamics of Circulation in Patent Ductus Arteriosus Dr. E. C. Eppinger
All interested persons are cordially invited to attend.

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9-10 a.m.

MEDICAL CONFERENCES

- Friday March 1—Rational Use of Chemotherapy Dr C. A. Janeway
Saturday March 2—Hospital case presentation. Dr S J Thannhauser
Tuesday March 5—Diagnosis and Treatment of Certain Hip Conditions. Dr J D Adams.
Wednesday March 6—Hospital case presentation. Dr Thannhauser
Thursday, March 7—The Phenomena of Taste and Smell. Dr Alexandra Adler
Friday March 8—Indications for Surgery in the Treatment of Peptic Ulcer Dr A. W. Allen.
Saturday, March 9—Hospital case presentation. Dr Thannhauser
Tuesday March 12—Review of Recent Cancer Literature. Dr W. M. Shedden.
Wednesday March 13—Hospital case presentation Dr Thannhauser
Thursday March 14—The Relation of Cancer of the Stomach to Pernicious Anemia. Dr Thomas Fujiwara
Friday March 15—Endocrinology Dr Fuller Albright
Saturday March 16—Hospital case presentation. Dr Thannhauser
Tuesday March 19—Clinicopathological conference Dr D. S. King.
Wednesday March 20—Hospital case presentation. Dr Thannhauser
Thursday March 21—Control of Gonococcal Infection. Dr O. F. Cox.
Friday March 22—Psychotherapy Dr Donald McPherson.
Saturday March 23—Hospital case presentation Dr Thannhauser
Tuesday March 26—X-ray demonstration. Dr Alice Eisinger
Wednesday March 27—Hospital case presentation. Dr Thannhauser
Thursday March 28—The medical, social and preventive aspects of a selected case. Preceptors and medical students.
Friday March 29—Some Observations on Pituitary Adenomas. Dr M. C. Sosman.
Saturday March 30—Hospital case presentation Dr Thannhauser

BOSTON LYING-IN HOSPITAL

The next meeting of the Journal Club will be held on Tuesday March 12, in the lecture hall of the Boston Lying-in Hospital at 8 15 p.m. Dr Douglas P. Murphy of the School of Medicine of the University of Pennsylvania, will present his work on topographic recordings of uterine motility

CARNEY HOSPITAL

The monthly meeting of the John T. Bottomley Society will be held at the Out Patient Department of Carney Hospital on Tuesday, March 5 at 11.30 a.m. Dr Benjamin Risenman will speak on "Vertigo."

Physicians and students are cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday March 6 from 2-00 to 4 00 p.m. Drs. Robert Zollinger and E. S. Emery will speak on "Indigestion."

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday evening March 5 at 8 15

Dr William B. Castle will speak on "The Blood Dyscrasias. An aspect of general medicine." A discussion and question period will follow

ST ELIZABETH'S HOSPITAL

The annual meeting of the Carney and St. Elizabeth's Hospital staffs will be held at St. Elizabeth's Hospital on March 7 at 12 o'clock noon. The meeting will be conducted by the staff of the Carney Hospital. The following papers will be presented

Sulfanilamide Treatment of Appendiceal Peritonitis. Dr John J. Todd.

Menopausal Bleeding. A review of 100 cases. Dr Edmund L. Carey

Simple Methods of Treatment in Fracture of Surgical Neck of Humerus. Dr John L. Doherty

Responsibility of the Urologist in Hypertension. Dr Charles J. E. Kickham.

UNITED STATES MARINE HOSPITAL

A staff meeting of the United States Marine Hospital Chelsea, will be held at "The Hut," on Friday afternoon, March 8 at 4 00. Dr Sylvester B. Kelley will talk his subject being "Injuries to the Urinary Tract."

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held at the nurses' residence on Thursday March 7 at 7 15 p.m. Drs. Clem McKoon and Richard Wadsworth will present a case of Simmonds' disease.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|----------|-----------------------|
| Lowell | March 1 | Albert H. Brewster |
| Salem | March 4 | Harold C. Bean |
| Haverhill | March 6 | William T. Green |
| Gardner | March 12 | Mark H. Rogers |
| Brockton | March 14 | George W. Van Gorder |
| Worcester | March 15 | John W. O'Meara |
| Pittsfield | March 18 | Francis A. Slowick |
| Northampton | March 20 | Garry deN. Hough, Jr |
| Fall River | March 25 | Eugene A. McCarthy |
| Hyannis | March 26 | Paul L. Norton |

AMERICAN BOARD OF INTERNAL MEDICINE, INC.

The American Board of Internal Medicine will conduct oral examinations just previous to the meeting of the American College of Physicians in Cleveland and just in advance of the meeting of the American Medical Association.

ciation in New York City Applicants who have successfully passed the written examination and plan to take the oral examination in 1940 should advise the office of the secretary at least six weeks in advance of the date of the examination they desire to take.

The next written examination for 1940 will be given on October 21 Applications for this examination must be filed in the secretary's office by September 1 Application forms may be obtained from Dr William S Middleton, secretary treasurer, 1301 University Avenue, Madison, Wisconsin

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, MARCH 3

SUNDAY MARCH 3

- 4 p.m. Backache Dr Frank R Ober Free public lecture. Harvard Medical School amphitheater of Building D
- 4 p.m. Surgical Diseases of Bone. Dr John D Adams Illustrated public health lecture Faulkner Hospital auditorium

MONDAY MARCH 4

- 5 p.m. The Hypothalamus and the Sympathetic Nervous System Dr S Walter Ranson Edward K Dunham lecture. Harvard Medical School amphitheater Building C

TUESDAY MARCH 5

- *9-10 a.m. Diagnosis and Treatment of Certain Hip Conditions Dr John D Adams Joseph H Pratt Diagnostic Hospital
- *11 30 a.m. Vertigo Dr Benjamin Riseman John T Bottomley Society Out Patient Department Carney Hospital
- *5 p.m. Research conference of the medical staff of the Peter Bent Brigham Hospital
- 8 15 p.m. The Blood Dyscrasias An aspect of general medicine Dr William B Castle. Greater Boston Medical Society Beth Israel Hospital auditorium

WEDNESDAY MARCH 6

- *9-10 a.m. Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital
- *2-4 p.m. Indigestion Drs Robert Zollinger and E. S Emery Peter Bent Brigham Hospital.
- 5 p.m. Hypothalamohypophyseal Relationships Dr S Walter Ranson Edward K Dunham lecture. Harvard Medical School amphitheater Building C

THURSDAY MARCH 7

- *9-10 a.m. The Phenomena of Taste and Smell Dr Alexandra Adler Joseph H Pratt Diagnostic Hospital
- 12 m Annual meeting of the Carney and St Elizabeth's Hospital staffs St Elizabeth's Hospital
- *5 p.m. Clinicopathological conference Faulkner Hospital
- 7 15 p.m. Clinical conference and meeting of the staff of the New England Hospital for Women and Children

FRIDAY MARCH 8

- *9-10 a.m. Indications for Surgery in the Treatment of Peptic Ulcer Dr A W Allen Joseph H Pratt Diagnostic Hospital
- 5 p.m. The Hypothalamus and Behavior Dr S Walter Ranson Edward K Dunham lecture Harvard Medical School amphitheater Building C

SATURDAY MARCH 9

- *9-10 a.m. Hospital case presentation Dr Thannhauser Joseph H Pratt Diagnostic Hospital

*Open to the medical profession

MARCH 1—Staff meeting United States Marine Hospital Page 331 issue of February 22

MARCH 1-30—Joseph H Pratt Diagnostic Hospital Page 369

MARCH 2 JUNE 8 and 10—American Board of Ophthalmology Page 719 issue of November 2

MARCH 3—Free public lecture. Quincy City Hospital Page 77 issue of January 11

MARCH 7-9—New England Hospital Association Hotel Statler Boston

MARCH 8—Staff meeting United States Marine Hospital Page 369

MARCH 12—Journal Club of the Boston Lying in Hospital Page 369

MARCH 14—Pentucket Association of Physicians 8 30 p.m. Hotel Bartlett Haverhill

APRIL 15-17—American Association for the Study of Goiter Page 203 issue of February 1

APRIL 15-19—New England Health Institute. Page 284 issue of February 15

APRIL 24—Massachusetts Dental Society Page 365

APRIL 24-26—Scientific Session Academy of Physical Medicine. Hotel John Marshall Richmond Virginia.

MAY 10-18—American Scientific Congress Page 1043 issue of December 28

MAY 13—United States Pharmacopoeial Convention Page 202, issue of February 1

JUNE 7-9—American Board of Obstetrics and Gynecology Page 1019 issue of June 15

JUNE 10-14—American Physicians Art Association Page 332, issue of February 22

OCTOBER 21—American Board of Internal Medicine, Inc. Notice above.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MARCH 6—Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcus Infections Dr Champ Lyons. Lynn Hospital Lynn

APRIL 3—Addison Gilbert Hospital Gloucester

MAY 8—Annual meeting Salem Country Club Peabody

FRANKLIN

MARCH 12—Franklin County Hospital, Greenfield

MAY 14—Franklin County Hospital Greenfield

HAMPSHIRE

MARCH 13

MAY 8

Meetings are held at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MARCH 20

MAY 15

Meetings are held at 12 15 p.m. at the Unicorn Country Club Stoneham.

MIDDLESEX NORTH

APRIL 24

JULY 31

OCTOBER 30

NORFOLK SOUTH

MARCH 7

APRIL 4

MAY 2

All meetings with the exception of one which is usually held at the Quincey City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon

PLYMOUTH

MARCH 21—Goddard Hospital Brockton

APRIL 18—State Farm

MAY 16—Lakeville Sanatorium Lakeville

SUFFOLK

MARCH 27—Scientific meeting Symposium on Ulcerative Colitis and Diarrhea Under the direction of Dr Chester M Jones

APRIL 24—Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

MAY 2—Censors meeting Page 244 issue of February 8

WORCESTER

MARCH 13—Worcester Memorial Hospital

APRIL 10—Worcester Hahnemann Hospital

MAY 8—Worcester Country Club

Each meeting begins with a dinner at 6 30 p.m. and is followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

The New Food, Drug, and Cosmetic Legislation Vol. VI, No 1 Law and Contemporary Problems 182 pp Durham Duke University School of Law, 1939 75c

Abnormal Speech E J Boome, H M S Baines and D G Harries 162 pp Cleveland The Sherwood Press, 1939 \$2 50

Diseases of the Gallbladder and Bile Ducts Waltman Walters and Albert M Snell 645 pp Philadelphia and London W B Saunders Co, 1940 \$10 00

Injection Treatment of Hernia, Hydrocele, Ganglion, Hemorrhoids, Prostate Gland, Angioma, Varicocele, Varicose Veins, Bursae, and Joints Penn Riddle. 290 pp Philadelphia and London W B Saunders Co, 1940 \$5 50

- Miss Susie Slagle's* Augusta Tucker 322 pp. New York and London Harper & Brothers, 1939 \$2.50
- Clinical Toxicology* Clinton H. Thienes. 309 pp. Philadelphia Lea & Febiger 1940 \$3.50.
- Functional Diseases of the Intestines* Gustav Singer 80 pp. London New York and Toronto Oxford University Press, 1939 \$2.50
- Manual of Cardiology Clinical methods and case histories as problems for study* William D Reid. 364 pp. London, New York and Toronto Oxford University Press 1940 \$3.50.
- Shock Blood studies as a guide to therapy* John Scudler 315 pp. Philadelphia Montreal and London J B Lippincott Co., 1940 \$5.50.
- Studies from the Rockefeller Institute for Medical Research* Vol. 114 640 pp. New York The Rockefeller Institute for Medical Research 1940 \$2.00.
- Orthopedic Operations Indications technique and end results* Arthur Steindler 766 pp. Springfield, Illinois and Baltimore Charles C Thomas, 1940. \$9.00
- Pulmonary Tuberculosis in Adults and Children* James A. Miller and Arvid Wallgren. 193 pp. New York and Edinburgh Thomas Nelson & Sons, 1939 \$3.50.
- The Anatomy of the Nervous System From the standpoint of development and function.* Stephen W Ranson. Sixth edition. 507 pp Philadelphia and London W B Saunders Co., 1939 \$6.50

BOOK REVIEWS

- Asthma.* Frank Coke. With the collaboration of Harry Coke. Second edition. 266 pp. Baltimore The Williams & Wilkins Co. 1939 \$4.00

Thus, the second edition of Dr Coke's book, is interesting chiefly because it accentuates the difference in the treatment of bronchial asthma in England and in the United States. It might be suspected that the allergic problems were inherently dissimilar but, except for the absence of ragweed, they are essentially the same. For the first portions of the book much praise is due. The etiology and the signs and symptoms of asthma are clearly and concisely described. Except for the importance given to the sedimentation rate, his examination of cases follows the general rule. In treatment, however Dr Coke advocates methods which many American allergists would find difficult to accept.

In discussing the treatment of inhalant sensitivity he states (page 199) "At the end of a week of daily injections, he [the patient] should be symptom free and remain so during the remainder of the treatment although it is never possible to give any guarantee of this." In this country such gratifying immediate and complete success is the exception rather than the rule.

Regarding the use of morphine in asthma, there has in the past been some controversy the majority of the workers, however from Salter in 1880 to Henderson and Rice in 1939 have been against its use. Morphine slows the respiratory rate, reduces tidal volume and makes the reflexes affecting respirations more pronounced, probably reducing the sensitivity of the respiratory cells to carbon dioxide. Dr Coke states "I think it is important to give enough morphine when it is used and should suggest one-third of a grain, but morphine sulphate, 1/4 gr., of atropine sulphate, 1/150 gr., is usually sufficient to break the attack." Undoubtedly this treatment will break an attack, but euthanasia when practiced should be practiced unwittingly and not unwittingly by the attendant physician who only too often explains, post mortem that the at-

tack was so severe that not even morphine would control it. In skillful hands in small doses for rare patients, morphine may be useful but it is not a drug to use indiscriminately in the dosage suggested.

Dr Coke also advocates the Danysz vaccine for non-specific treatment. This vaccine, made of "all the organisms found growing in the intestine," is used, apparently with great success, for all types of asthma and also for hay fever due to pollen but not treated with specific pollen extract. In England a specific vaccine made of *Enterococcus faecalis* has been used by Freeman and by Fleming for the treatment of certain types of intrinsic asthma and in this country vaccines of bacteria from the upper respiratory tract have been used by Brown in conjunction with pollen for non-specific treatment in hay fever but the reviewer is of the opinion that almost all allergists are agreed that such non-specific vaccines are indifferent in effect and variable in result. Dr Coke also recommends, but less strongly the use of autobemotherapy and peptone by mouth and by injection—two methods generally considered of little value.

The use of helium by inhalation that of epinephrine in oil by subcutaneous injection and that of aminophyllin and sucrose intravenously are not mentioned. The methods given however safe and successful in the author's hands, are not universally accepted and may if used unskillfully be dangerous.

- A Handbook on Diabetes Mellitus and Its Modern Treatment* J P Bose. Third edition. 272 pp. Calcutta Thacker Spink & Co., Ltd., 1939 Rs. 7-8

This text, intended for the general practitioner and medical student and based on the author's practice in India, includes, in its third edition, a section on blood lipoids, with particular reference to the relation of cholesterol to arteriosclerosis and a chapter on protamine zinc insulin.

Of special interest is the inclusion of data concerning the chemical nature of the Indian dietary the author states "What gout is to the nobility of England, diabetes is to the aristocracy of India." He regards chronic dietary excesses combined with indolent habits as mainly responsible for both. Among 2000 patients 68.2 per cent were Hindus and only 14.6 per cent Mohammedans, the latter figure being slightly less than that for the incidence of Europeans of his series. These differences he regards as artificial since Mohammedan women are so seldom examined medically. However in India as elsewhere, the mortality rate is increasing and the rise between 1929 and 1934 was much greater among the Mohammedans than among any other group. Thus, in the city of Calcutta the diabetic mortality rate was 5.2 per 1000 in 1929 and 20.7 in 1934.

In treatment, the author's usual practice is to put the patient on one of three diets according to racial customs, containing 100 gm. of carbohydrate, 80 gm. of protein and 100 gm. of fat. After a week on such a limited diet, the tolerance is determined and, if necessary insulin given. Then the diet is raised to 30 calories or more per kilogram.

- Diseases of the Foot* Emil D W Hauser 472 pp. Philadelphia and London W B Saunders Co. 1939 \$6.00.

This book is a praiseworthy piece of bookmaking it is profusely illustrated several of the cuts being in color.

The author has devised, and describes, certain appliances and methods of shoe alteration with which his name is associated. He advances certain theories which are not always consonant with common orthopedic practice, mini-

mizing, for example, the value of special exercises for developing and properly balancing the muscles which control the position of the foot in weight bearing—a defeatist attitude which perhaps is not warranted. He places chief reliance on controlling the position of the foot by felt pads and shoe alterations, advising patients to work out their own salvation in locomotion.

Several chapters merit special commendation. In Chapter 3, proper emphasis is given to the fact that the foot is not an isolated organ of locomotion but intimately coordinated with, and influenced by, the mechanics of the body as a whole, the foot in its turn exerts an influence on these same mechanisms. Chapter 4, dealing with the hygiene and general care of the feet, is excellent, as are also Chapter 13 on fractures of the foot and ankle and Chapter 26 on the care of the feet during pregnancy and following prolonged illness. Chapters 27, 28, 29 and 30 on the special technics, including local anesthesia, methods of manipulation and special appliances, are clearly written and will be found to be very useful.

The essential etiology of many foot ills is said to be "functional decompensation", this may be true, but the proof is not always so clear as the reader might wish. In advocating certain operative methods, it seems as though the debt we owe to such outstanding pioneers as Michael Hoke and H. Winnett Orr should be acknowledged.

The book is an attempt to cover all ills of the human foot from an embryological, anatomical, physiological and etiologic background, and the author—a busy and successful practitioner—describes the treatment that he has found most efficient, an approach to the subject which is certainly practical. The task which he set himself was a hard one, he has evidently labored zealously to fulfil it, but has been taken rather far afield.

Mental Health Publication of the American Association for the Advancement of Science, No. 9 Edited by Forest R. Moulton and Paul O. Komora. 470 pp. Lancaster, Pennsylvania: The Science Press, 1939. \$3.50.

This series of papers on psychiatry and its contributions to medicine and to social welfare is extremely valuable. In a sense the audience, which consisted entirely of guests invited by a crucial committee, must be given a large part of the credit for the careful preparation of the summaries which were presented. Propaganda is practically absent. There are only a few instances where pure hope dominates a paper. Almost every contributor presents evidence which indicates an opportunity for better care of mental disease and better use of community resources for the study of mental health in general. The reviewer believes that this volume contains the best summary of psychiatry in relation to the community which is available. Obviously it is not to be used as a textbook, and equally obviously it is not likely to appeal to those who are not already interested.

Diseases of the Skin Richard L. Sutton and Richard L. Sutton, Jr. Tenth edition. 1549 pp. St. Louis: C. V. Mosby Co., 1939. \$15.00.

This edition of an increasingly popular textbook in dermatology is rapidly approaching the status of a single volumed encyclopedia. Not only are all the common diseases of the skin very thoroughly described from every angle, but even the rare dermatoses are adequately considered. Many of the special chapters are so complete that they are practically monographs on their particular subjects. For example, the chapter on diseases due to

fungi, which contains a small table of the characteristics of fungi for laboratory identification by Lewis and Hopper and which consists of 144 pages of material descriptive of fungous infections, is in itself almost worth the price of the entire book. The chapter on syphilis, which consists of about 100 pages and which contains a concise and succinct subchapter on the serodiagnosis of syphilis by Rein, is complete from every standpoint. The chapter dealing with the various diseases due to animal parasites is practically a complete course in parasitology.

All in all, nothing except the highest praise can be given to the authors, who not only have compiled as fine a text book in dermatology as can be placed within two covers, but also have devised a particularly interesting and unusually attractive method for the citation of references, which form in themselves an almost indispensable adjunct to the library of any dermatologist. There are 1452 illustrations in black and white and 21 in full color. This book should be on the bookshelf of every dermatologist.

Aids to Dermatology and Venereal Disease Robert M. B. Mackenna. Second edition. 284 pp. Baltimore: The Williams & Wilkins Co., 1939. \$1.25.

This small handbook by a well known dermatologist is unusually complete, clearly readable and well organized. It considers many aspects of a large number of the commoner skin diseases in a succinct form. The format of the book lends itself to quick reference. Although this was published early in 1939, several important contributions which were well established by then were omitted, for example, the so-called "quick" tests for syphilis, such as the rapid Kline and rapid Hinton tests, Marpharsen as an important anasyphilitic drug, and the intradermal test for chancroid using a vaccine of the Ducrey bacillus, these omissions are, however, not very serious for a small book with its limited space.

The book is unusually free from the frequent mention of patent remedies which occurs so commonly in many English and Continental texts. It also lacks the strange sounding descriptive dermatology that is frequently found in books not published in America. Although it has the shortcoming of all small, concise books in its tendency to dogmatism, most of the controversial aspects are fairly well covered. One can, of course, take exception to numerous sentences here and there, such as "X-rays are of considerable therapeutic use in psoriasis." Generally, however, this is a very commendable book, not only for students but for general practitioners, particularly in view of its low price.

The Doctor Prescribes Music: The influence of music on health and personality Edward Podolsky. 134 pp. New York: Frederick A. Stokes Co., 1939. \$1.50.

In these times there is so much to be learned that the average medical man in his unsuccessful effort to keep up to date is swamped by reading material. He attempts to select and choose those subjects which will contribute to his skill. No matter what he reads he attempts to derive information, added thought or some idea which becomes part of his being. The reviewer had hoped for just this when reading Podolsky's book, but found that he doubted a good many of the statements in the text and questioned the interpretations of the effects of music on the physiology of the organism. Although the reviewer prefers to hear music than read about it, he could not see any scientific relation between emotional experiences and the reflexes. There is no tool to measure emotions or sensations or the therapeutic value of an emotional experience.

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COMBINED DEGENERATION OF THE SPINAL CORD IN PERNICIOUS ANEMIA*

The Results of Seven Years' Experience with Parenteral Liver Therapy

MAURICE B. STRAUSS, M.D.,† PHILIP SOLOMON, M.D.,‡ and HERBERT J. FOX, M.D. §

BOSTON

IN MAY, 1935,¹ there was published the first comprehensive report from this clinic on the efficacy of parenteral liver therapy in the treatment of the neural manifestations of pernicious anemia. At that time it appeared evident that the spinal-cord lesions of otherwise uncomplicated pernicious anemia could be completely arrested by adequate parenterally administered liver extract. Furthermore, it was stated that patients with pernicious anemia without neural lesions would not develop spinal-cord degeneration if adequately treated. These conclusions were based on a study of 26 patients with marked spinal-cord lesions and 80 patients with minimal or no neural lesions, treated for an average period of three years. We have been able to continue observations on 21 of the first group and 64 of the second group for an additional four years, so that this report is based on 85 patients observed for an average period of seven years. This length of time warrants the drawing of conclusions which probably will not be altered in the future.

The general procedure outlined in the previous report has been continued. The patients received intramuscularly Solution Liver Extract Lilly (N.N.R.)^{||} prepared according to the method of Strauss, Taylor and Castle.² It is estimated that this material contains about one USP unit to the cubic centimeter. It is an aqueous solution of "Fraction G" of Cohn, Minot and their associates³ and contains many other substances present in liver besides the hematopoietically active material for pernicious anemia. Most of the patients received 10 cc of this extract at weekly intervals.

A few received as much as 10 cc. three times a week, and others as little as 10 cc every three weeks. The keynote of treatment remained, as before, the administration of more extract than was necessary merely for the maintenance of normal blood values.

RESULTS

The 21 patients with marked involvement of the cord had spasticity or ataxia, or both, resulting in definite disturbances in locomotion. With out exception these patients also had paresthesias in the hands and feet, and all had either diminished or absent vibratory sense in the legs and moderate to marked muscle weakness. Impotence, not due to age, or sphincter disturbances were encountered in five patients. Girdle sensations were common.

The average red-blood-cell count during the period of adequate treatment was 4,800,000, the hemoglobin 94.6 per cent (147 gm per 100 cc.) and the color index 0.98.

In no single case did any objective neurologic sign become more marked during the seven year period of treatment, nor did an abnormal sign not previously present, appear in any of the 21 patients with marked spinal-cord involvement. This indicates a complete arrest of the degenerative process. Improvement in strength, ability to get about and general subjective improvement of greater or less degree appeared in every patient during the first two or three years of treatment, as was noted in the previous publication. Objective signs due to peripheral nerve involvement disappeared in general within six months after beginning treatment. Objective signs of spinal cord disturbance occasionally disappeared or became less marked during the first year or two of adequate treatment, but thereafter remained unchanged.

||Supplied through the courtesy of Eli Lilly and Company, Indianapolis.

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard) and the Neurologic Unit of the Boston City Hospital, and from the Departments of Medicine and Neurology of the Harvard Medical School.

*Associate in medicine, Harvard Medical School; Ju. for visit. g. physician, Boston City Hospital.

†Assistant in neurology, Harvard Medical School.

‡Assistant in medicine, Harvard Medical School; assistant resident physician, Thorndike Memorial Laboratory, Boston City Hospital.

The 64 patients without marked neural lesions had either no signs referable to the nervous system or else evidence of mild lesions not interfering with their ability to walk. Not only is it statistically certain that many of these individuals would have developed crippling spinal-cord damage if inadequately treated over a period of seven years, but we have ourselves observed during this time a number of untreated or inadequately treated patients who have developed severe spinal-cord degeneration. In none of these 64 patients adequately treated for seven years has any further evidence of neural damage appeared. This indicates that adequate therapy prevents the development of combined degeneration of the spinal cord in patients with pernicious anemia.

DISCUSSION

Our earlier communication¹ listed some of the more important studies concerning the effect of therapy on the neural lesions of pernicious anemia. At that time it appeared that, although there was considerable difference of opinion, most workers who had employed large quantities of liver, liver extract or dried stomach reported favorable results. A survey of literature not included in the previous report shows that the preponderant opinion is optimistic. Mills,⁴ Farquharson,⁵ Murphy,⁶ Schilling,⁷ Allen,⁸ Schaller and Newman,⁹ Cohen,¹⁰ Greenfield and O'Flynn,¹¹ Haden¹² and many others have all reported satisfactory results in the treatment of combined degeneration of the spinal cord in pernicious anemia.

Furthermore, Suh and Merritt¹³ have noted that patients with combined degeneration of the spinal cord without other obvious evidence of pernicious anemia show no progression if treated with adequate amounts of liver extract by the parenteral route.

However, at least three reports which were not available until after our previous communication had gone to press have disagreed with the generally accepted belief that adequate liver therapy will arrest the progress of the neural lesions of pernicious anemia. Grinker and Kandel¹⁴ state "Quantities of liver in excess of that necessary to maintain a normal blood level are wasted. In our series of cases progression of symptoms and signs occurred in patients under continuous and adequate liver therapy with blood counts within normal limits." The highest recorded counts for these 10 cases were 41, 36, 40, 43, 50, 40, 44, 36, 31 and 38 $\times 10^6$ red blood cells, an average of 4,000,000 cells. Only one of these counts can be considered within normal limits, and thus liver therapy was obviously inadequate. No attention whatsoever was paid to the size of the cells, which

is more important than the actual level. The aim should be to restore the blood to normal in all respects so that the mean corpuscular volume and Price-Jones curves fall within approximately the normal range.

Needles¹⁵ in 1936 concluded "In some cases liver therapy prevents the onset of myelopathy, in others it does not." This statement was based on a study of 13 cases, in 6 of which therapy was admittedly inadequate, and in the remaining 7 no data are given by which the reader may judge of the adequacy of treatment. However, Needles does state "Of the patients who formed the basis for this study, it so happened that none who received sufficient treatment showed more than insignificant neurologic signs—and then in several cases not definitely attributable to subacute combined degeneration—while four showed no signs whatever."

Goldhamer, Bethell, Isaacs and Sturgis¹⁶ reported in 1934 that 34 per cent of 103 inadequately treated cases of pernicious anemia with neural lesion showed an unfavorable progression of neural signs in contrast to 8 per cent of 182 "adequately" treated patients. However, the criterion of "adequate" treatment was an erythrocyte count of 4,000,000 or higher—a fallacy which has been discussed above. The very fact that over four times as many patients showed progressive lesions with little treatment as did those with more treatment suggests that truly "adequate" treatment might have prevented any unfavorable progression of neural lesions. Furthermore, in a recent review Sturgis¹⁷ states "We have never observed objective signs of cord changes develop or progress during a period when the blood has been uniformly normal. Having this knowledge, the intensive treatment of the anemia is certainly the obvious and logical principle upon which our treatment should be based."

It is apparent from this analysis that the above authors who have reported failure to arrest the progress of the neural lesions of pernicious anemia have all failed to administer sufficient therapy to their patients. A word may well be said here as to just what is adequate treatment for the individual patient. First, material must be given to maintain the blood values at normal in every respect. Not only should the red cells number 4,500,000 or higher, but the mean corpuscular volume should be below 100 cu microns, and the color index 1.0 or below. Second, there must be no symptoms of any nature, such as glossitis or indigestion, attributable to pernicious anemia. Third, and most important, should there be any recurrence at any time of persistent numbness, tingling or other paresthesia of the extremities,

the dose of liver extract must be increased, usually doubled. Fourth, if the patient presents any other subjective manifestations that might be attributed to progression of the spinal-cord lesion, the dose should be doubled. The experience we have had establishes the fact that over an average period of seven years adequate therapy as described above has been effective in preventing further spinal-cord damage in patients who already have fairly marked lesions and has prevented the development or unfavorable progression of lesions in patients with no or minimal damage.

SUMMARY AND CONCLUSIONS

Twenty-one patients with pernicious anemia and advanced combined degeneration of the spinal cord were treated by the intramuscular injection of adequate amounts of liver extract for an average period of seven years. Complete arrest of the neural lesions occurred in every case.

Sixty-four other patients with pernicious anemia and little or no neurologic disturbances were treated in the same manner over an average period of seven years. In none of these patients was there any evidence that spinal-cord lesions progressed or developed under treatment.

The conclusion stated in 1935, now amplified by four additional years of experience, may be restated at this time. By means of appropriate

parenteral liver extract therapy for each case, the spinal-cord lesions of pernicious anemia may be prevented from developing or, having appeared, may be completely arrested.

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REGIONAL ILEITIS*

SAMUEL F. MARSHALL, M.D.†

BOSTON

REGIONAL ileitis is one of the most interesting disease entities that has come to the attention of internists and surgeons during the past few years. Benign nonspecific granulomatous tumors of the bowel had been recognized and described for many years before attention was directed to regional ileitis as a clinical entity by Crohn, Ginzburg and Oppenheimer¹ in 1932. Certainly it is due to these writers that the clinical condition received proper recognition and that the course of the disease, together with the roentgenologic picture and the treatment, has been put on an established basis. Inflammatory tumors of the bowel were recognized and described in this country by Senn² as early as 1895. Later Braun³ (1909) published a report of the disease, and in

1923 Moschowitz and Wilensky⁴ described granulomatous tumors of the bowel in 4 patients.

Many reports fill the literature since the first description by Crohn and his associates, and much has been added to the detailed characteristics of the disease, both as to its recognition and as to the type of treatment, together with the fact that it responds so favorably to surgical treatment. Of special interest are reports of cases by other writers, notably Meyer and Rosi,⁵ Mock,⁶ Erdmann and Burt,⁷ Brown, Bagen and Weber,⁸ Homans and Hass,⁹ Mixter¹⁰ and Adams¹¹. Jackson¹² in 1937, in a collective review of American literature on this subject found 219 cases reported since Crohn's original article and added descriptions of 4 more. Crohn¹³ further reports 110 personally observed cases, in 73 of which the diagnosis was confirmed by operation.

The present study of regional ileitis is based on

*Read by title at the annual meeting of the New England Surgical Society, Boston, Massachusetts, September 29-30, 1939. From the Department of Surgery, Lahey Clinic, Boston.

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The 64 patients without marked neural lesions had either no signs referable to the nervous system or else evidence of mild lesions not interfering with their ability to walk. Not only is it statistically certain that many of these individuals would have developed crippling spinal-cord damage if inadequately treated over a period of seven years, but we have ourselves observed during this time a number of untreated or inadequately treated patients who have developed severe spinal-cord degeneration. In none of these 64 patients adequately treated for seven years has any further evidence of neural damage appeared. This indicates that adequate therapy prevents the development of combined degeneration of the spinal cord in patients with pernicious anemia.

DISCUSSION

Our earlier communication¹ listed some of the more important studies concerning the effect of therapy on the neural lesions of pernicious anemia. At that time it appeared that, although there was considerable difference of opinion, most workers who had employed large quantities of liver, liver extract or dried stomach reported favorable results. A survey of literature not included in the previous report shows that the preponderant opinion is optimistic. Mills,⁴ Farquharson,⁵ Murphy,⁶ Schilling,⁷ Allen,⁸ Schaller and Newman,⁹ Cohen,¹⁰ Greenfield and O'Flynn,¹¹ Haden¹² and many others have all reported satisfactory results in the treatment of combined degeneration of the spinal cord in pernicious anemia.

Furthermore, Suh and Merritt¹³ have noted that patients with combined degeneration of the spinal cord without other obvious evidence of pernicious anemia show no progression if treated with adequate amounts of liver extract by the parenteral route.

However, at least three reports which were not available until after our previous communication had gone to press have disagreed with the generally accepted belief that adequate liver therapy will arrest the progress of the neural lesions of pernicious anemia. Grinker and Kandel¹⁴ state "Quantities of liver in excess of that necessary to maintain a normal blood level are wasted. In our series of cases progression of symptoms and signs occurred in patients under continuous and adequate liver therapy with blood counts within normal limits." The highest recorded counts for these 10 cases were 41, 36, 40, 43, 50, 40, 44, 36, 31 and 38×10^6 red blood cells, an average of 4,000,000 cells. Only one of these counts can be considered within normal limits, and thus liver therapy was obviously inadequate. No attention whatsoever was paid to the size of the cells, which

is more important than the actual level. The aim should be to restore the blood to normal in all respects so that the mean corpuscular volume and Price-Jones curves fall within approximately the normal range.

Needles¹⁵ in 1936 concluded "In some cases liver therapy prevents the onset of myelopathy, in others it does not." This statement was based on a study of 13 cases, in 6 of which therapy was admittedly inadequate, and in the remaining 7 no data are given by which the reader may judge of the adequacy of treatment. However, Needles does state "Of the patients who formed the basis for this study, it so happened that none who received sufficient treatment showed more than insignificant neurologic signs—and then in several cases not definitely attributable to subacute combined degeneration—while four showed no signs whatever."

Goldhamer, Bethell, Isaacs and Sturgis¹⁶ reported in 1934 that 34 per cent of 103 inadequately treated cases of pernicious anemia with neural lesion showed an unfavorable progression of neural signs in contrast to 8 per cent of 182 "adequately" treated patients. However, the criterion of "adequate" treatment was an erythrocyte count of 4,000,000 or higher—a fallacy which has been discussed above. The very fact that over four times as many patients showed progressive lesions with little treatment as did those with more treatment suggests that truly "adequate" treatment might have prevented any unfavorable progression of neural lesions. Furthermore, in a recent review Sturgis¹⁷ states "We have never observed objective signs of cord changes develop or progress during a period when the blood has been uniformly normal. Having this knowledge, the intensive treatment of the anemia is certainly the obvious and logical principle upon which our treatment should be based."

It is apparent from this analysis that the above authors who have reported failure to arrest the progress of the neural lesions of pernicious anemia have all failed to administer sufficient therapy to their patients. A word may well be said here as to just what is adequate treatment for the individual patient. First, material must be given to maintain the blood values at normal in every respect. Not only should the red cells number 4,500,000 or higher, but the mean corpuscular volume should be below 100 cu microns, and the color index 1.0 or below. Second, there must be no symptoms of any nature, such as glossitis or indigestion, attributable to pernicious anemia. Third, and most important, should there be any recurrence at any time of persistent numbness, tingling or other paresthesia of the extremities,

icians and surgeons and has been thought to be tuberculosis of the terminal ileum and cecum resection being done on this basis. In our 29 operated cases, 4 patients were referred to the clinic following previous laparotomy, at which time the surgeon

phatic disease of the mesentery, with the production of marked lymphedema of the bowel wall, and it has been suggested that there may be some association between regional ileitis and lymphadenitis of early childhood, so commonly seen,

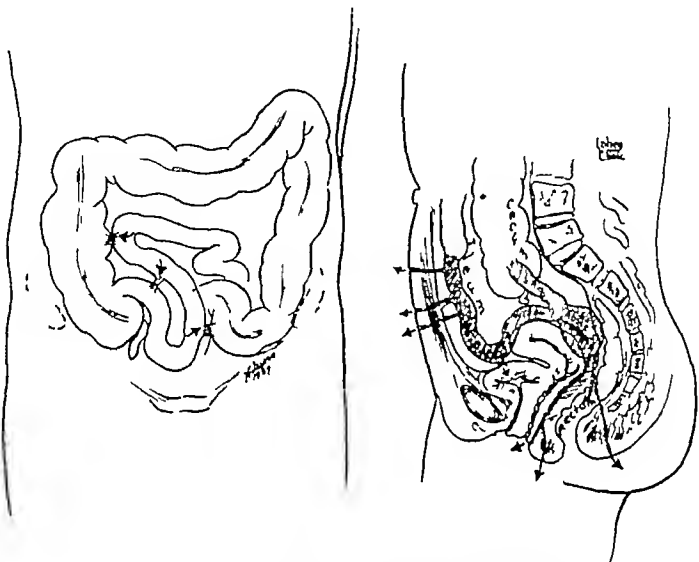


FIGURE 2. Types of Fistulas Encountered at Operation.

The diagram on the left shows the fistulous tracts formed between the ileum and an adjacent loop of small bowel, the terminal ileum, the ascending colon and the sigmoid. That on the right illustrates fistulous tracts noted extending through the abdominal wall (the commonest type) and into the bladder and types of perirectal fistulas.

had diagnosed the condition as tuberculosis of the small bowel. Two patients were confined to tuberculosis sanatoriums for some time before being referred for abdominal surgery. Crohn states that the disease is definitely not caused by the tubercle bacillus, and in none of his specimens has this bacillus been demonstrated or recovered. The disease is chronic, it progresses insidiously with the development of a palpable abdominal mass, and is complicated by the production of internal and external fistulas and later, by obstruction due to the marked contraction and narrowing of the lumen of the bowel.

The cause of the disease has not been established, although there are many theories as to its origin. The work by Felsen¹¹ appears to suggest a dysentery bacillus as the causative agent, but even in cases reported by him such bacilli have not been isolated from the resected specimens. Another theory has been that the condition is due to lym-

phatic disease of the mesentery, with the production of marked lymphedema of the bowel wall, and it has been suggested that there may be some association between regional ileitis and lymphadenitis of early childhood, so commonly seen,

which may possibly be associated with small lesions of the mucosa which are unrecognized. It has been emphasized in the literature that the disease has an especial predilection for the Hebrew race, but in our series of 29 operated cases there were only 3 Jewish patients. With the accumulation of further reports in this country and abroad, it appears that the disease may occur in any race and in any class of people. The sex distribution also is of interest, most of the reports showing the disease to occur more commonly in men than in women, the proportion being 2:1 or 3:2. In our series of operated cases there were 13 men and 16 women, which is somewhat a reversal of other reported series.

Regional ileitis is apparently a disease of young adults, and most commonly occurs in the third and fourth decades (Table 1). Twenty of our cases confirmed by operation occurred in individuals be-

tween twenty and forty years of age The youngest patient was sixteen, and the oldest sixty-nine

Regional ileitis is characterized by pain in the right lower quadrant, associated with nausea, diarrhea, loss of weight and anemia In the later stages a palpable mass frequently is readily made out The course of the disease is that of a chronic, progressive inflammatory process which may persist for months or even years However, the onset

TABLE 1 Age Distribution in 29 Operated Cases

| AGE | NO OF CASES |
|-------|-------------|
| 10-20 | 4 |
| 20-30 | 11 |
| 30-40 | 9 |
| 40-50 | 2 |
| 50-60 | 2 |
| 60-70 | 1 |

may be acute and characterized by symptoms easily confused with those of acute appendicitis The patient complains of pain, associated with nausea and occasionally vomiting, and localized in the right lower quadrant of the abdomen, and to all intents and purposes the condition closely simulates a genuine attack of appendicitis However, the common course is that of a long-standing chronic disease, and a careful evaluation of the history and symptoms frequently suggests the true nature of the process within the abdomen

Typical cases of regional ileitis have been described in detail so frequently that the lesion is in the majority of cases correctly diagnosed Certainly the lesion in the terminal ileum is quite characteristic, and should the findings noted in the appendix not be consistent with the preoperative diagnosis of appendicitis, the ileum should certainly be carefully examined By so doing many errors can be avoided This confusion with acute appendicitis is not unusual, and of our 29 patients operated on, 15 had had a previous appendectomy, the true nature of the disease apparently being recognized in only 2 cases Seventeen patients had had operations previous to admission to the clinic. Seven had had two or more abdominal operations, and 1 patient had had seven previous abdominal operations without the true pathological condition's being recognized As stated before, the condition is frequently confused with tuberculosis

Symptoms of intestinal obstruction are not uncommon, though a complete obstruction rarely occurs The patients complain of distention associated with crampy abdominal pain and vomiting, and roentgenological examination frequently shows marked diminution in the lumen of the bowel, with dilated loops proximal to the area of stenosis

One of the commonest complications is the occurrence of fistulas (Fig 2), which may be either

internal or external in their course With the progression of the inflammatory process in the bowel and with ulceration of the mucosa, perforations frequently occur, and these may penetrate



FIGURE 3 "String Sign" in the Terminal Ileum
It is indicated by the arrow and is a typical x-ray finding in cases of regional ileitis Note the dilated and obstructed loop of small bowel proximal to the narrowed terminal ileum

into the adjacent adherent loops of bowel, commonly into the sigmoid or cecum or into other loops of the small bowel In a young woman with an acute fulminating enteritis involving the terminal ileum, acute perforation occurred, death resulting from generalized peritonitis Perforation may also occur with the formation of an abscess, 3 of our patients were admitted with an abscess in the right lower quadrant of the abdomen, which was taken to be an appendiceal abscess until the true nature of the process was recognized at operation Perforation took place into the sigmoid in 1 case and into the urinary bladder in 1 Perforation into the adjacent ascending colon is not uncommon, and this occurred in 2 cases

External fistulas on the anterior abdominal wall are common (Fig 2), and usually follow one or more previous abdominal operations in which an appendectomy has been done under the impression that the symptoms were due to appendicitis The initial complaint in 7 cases in which resection for regional ileitis was successfully done was

that of a draining fistula in the right lower quadrant. All these fistulas followed appendectomy with drainage. One patient gave a history of having had frequent fistulas for more than two years



FIGURE 4 X Ray Findings in Regional Ileitis.

The patient was a man aged twenty-six with symptoms for over six years. The small bowel is obstructed by a cicatrizing process. Note the marked narrowing ("string sign") of the terminal ileum. The arrow points to a fistulous tract between adherent involved loops of ileum. Operation a two-stage resection of the ileum and ascending colon was followed by recovery.

before the nature of the condition was recognized. Such patients present themselves to the surgeon with a history of previous right lower quadrant pain followed by appendectomy, with no improvement in their distress and with the development of a fecal fistula in the right lower quadrant. In most cases fistulous tracts will be demonstrated to arise from a terminal ileum affected with a cicatrizing, granulomatous, inflammatory process. Such a history given by a patient should make the examiner suspect regional ileitis, and the diagnosis can be readily established by serial roentgenograms of the intestine and by roentgenological examination following Lipiodol injection of the fistulous tract.

The final diagnosis is established by roentgenological examination (Figs 3 and 4). A barium meal is administered by mouth and roentgenological examination is made after the third, fourth, fifth sixth and tenth hours. Characteristic filling defects are noted in the terminal ileum, and in the advanced cases marked stenosis of the

bowel reduces the lumen so that only a thin, irregular linear shadow is seen, presenting the "string sign" that has been described by Kantor¹⁵. The passage of barium through the ileum is delayed, and dilatation of the ileum proximal to the filling defects is readily made out. Areas of constriction alternating with segments of normal or slightly dilated bowel may be demonstrated. The filling defects of the terminal ileum just proximal to the cecum are characteristic, and the roentgenological findings taken in conjunction with the history establish the diagnosis quite accurately in the large majority of cases. Examination after administration of a barium enema should also be made, in order to rule out other lesions of the colon and to demonstrate the possible involvement of the cecum and colon with the granulomatous, inflammatory process.



FIGURE 5 Extensive Involvement of the Intestine with Cicatrizing Enteritis

There is residual barium in the stomach also areas of thickening and narrowing of the small bowel alternating with dilated obstructed loops. The lesion apparently starts in the proximal jejunum and extends through the terminal ileum. The process was too extensive for surgical removal.

There has been much discussion as to whether the surgical management should consist of radical removal of the involved bowel or the more conservative procedure of ileocolostomy. It is likely that spontaneous remission of the disease occurs

in many cases, but certainly in the advanced cases with marked granulomatous changes in the bowel and with stenosis and obstruction and ulceration, the only possibility of a permanent cure lies in removing the affected segment of bowel. In view of the tendency for these ulcerated areas to per-

hill and there is little to offer in surgical management (Fig 5). It is also generally conceded that operation in the acute phases of regional ileitis should be avoided. If it becomes necessary to perform a laparotomy in order to establish the diagnosis and rule out acute appendicitis, conservatism

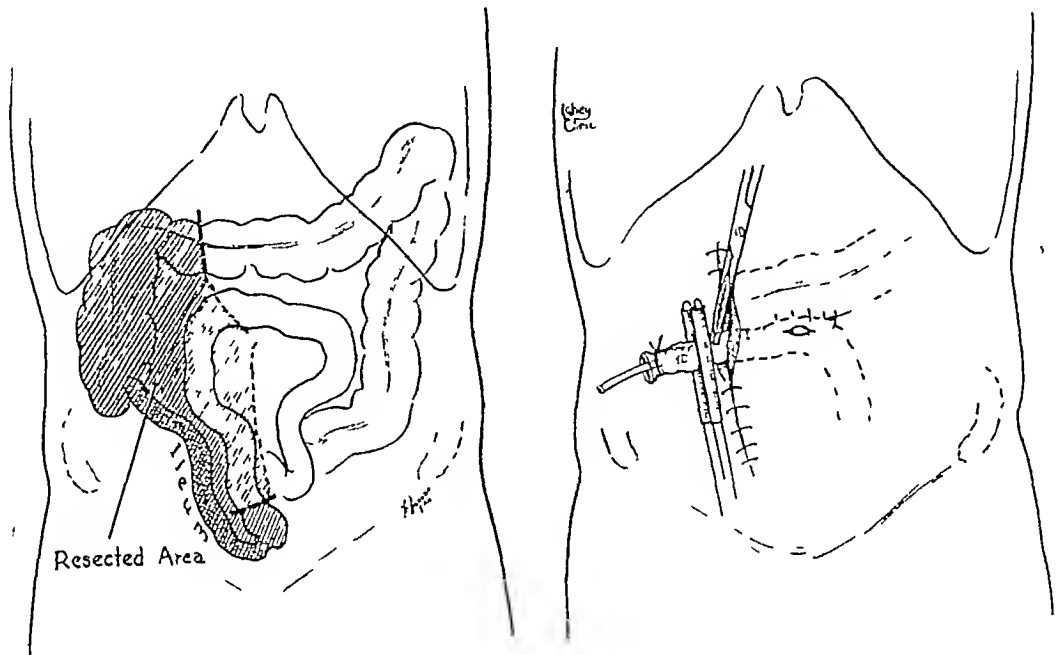


FIGURE 6 Two-Stage Resection for Regional Ileitis

In the diagram on the left the shaded area shows the section of bowel and the mesenteric attachment that are removed when the terminal ileum is involved with enteritis. That on the right shows how a Mikulicz spigot is formed between the ileum and the transverse colon, following removal of the affected bowel. The loop of ileum is staggered to permit immediate drainage of the bowel through a catheter.

forate, and the frequency of fistula formation either between adjacent loops of intestine or externally, resection should be considered early and is desirable for most cases, if the general condition of the patient permits such a radical operation. Certainly the large majority of patients with this

should be practiced, and the abdomen closed without intra-abdominal surgery or after a simple ileocolostomy has been established. Certainly in the presence of definite acute regional ileitis, appendectomy should not be done, as there is considerable risk of establishing an external fistula. Among 15 of our patients who had previously had an appendectomy, there were 8 with external fistulas. The 2 deaths in our operated cases occurred in patients in the acute phase of the disease, one in the presence of an acute regional ileitis associated with an abscess, and the other in an acute fulminating process in which an ileocolostomy was done.

TABLE 2 Type of Operation and Number of Deaths in 29 Cases of Regional Ileitis

| TYPE OF OPERATION | NO OF CASES | NO OF DEATHS |
|---|-------------|--------------|
| Resection with primary anastomosis | 5 | 0 |
| Preliminary colostomy and later resection | 4 | 0 |
| Mikulicz resection | 13 | 0 |
| Ileocolostomy only | 4 | 1 |
| Drainage of abscess | 3 | 1 |

disease ultimately require surgical treatment for permanent relief of their symptoms, and so far, the best results have been obtained by operation. It is conceded that the occasional patient with widespread involvement of the small intestine may of necessity be given medical treatment, because it is impossible to remove all the diseased bowel, but the course of these cases is progressively down-

Resection of the affected loops of intestine was carried out in 22 cases without a fatality (Table 2). In 17 of these patients resection was performed in two stages.

We prefer to carry out resection of the terminal ileum, cecum and ascending colon by the plan devised by Mikulicz for the left colon (Fig 6). Lahey¹⁰ has utilized this type of resection for all lesions of the right colon, and has described in detail the method, which can be carried out with

a much greater margin of safety than that accompanying a resection in one stage. Because in a small percentage of cases the cecum and ascending colon may be involved in the disease process, and also because the ileocecal junction is ulcerated in over half the cases, the cecum and ascending



FIGURE 7 Roentgenogram after a Barium Enema
This shows the ileocolostomy opening after resection of the ileum and ascending colon for regional ileitis

colon are removed with the terminal ileum. It must be re-emphasized that the margin of safety in performing two-stage resections of the terminal ileum and ascending colon is much greater than that in attempting to do such an extensive procedure at one sitting. These patients are usually seriously ill, in a poor state of nutrition, have had their condition for a long period of time and present extremely poor operative risks. The extent of the operation may be considerable when freeing adhesions, and frequently abscesses, as well as fistulous communications between adherent loops of the bowel, are broken into. To attempt such an extensive resection with immediate primary anastomosis greatly increases the operative hazard, and is unjustifiable in view of the excellent results and the comparative safety with which a two-stage Mikulicz type of resection can be carried out in a large majority of cases. The affected loop of the terminal ileum is resected, together with the cecum and ascending colon, and a Mikulicz spur is formed between the terminal ileum and the resected end

of the transverse colon, which has been brought out through an abdominal incision. The ileal loop is staggered in order to permit immediate drainage of the intestine with a catheter, which is tied in at the end of the ileum. At the end of a week the spur between the resected ends of the ileum and colon is gradually cut down, and it is completely divided by the time the patient is discharged from the hospital, which is usually sixteen or seventeen days after operation. These patients are then readmitted six weeks later for closure of the enterostomy opening, which is composed of the ends of the transverse colon and the ileum (Fig. 7).

The postoperative course of these patients who have had a two-stage resection after the Mikulicz plan is uneventful and extremely satisfactory. They usually show great improvement in general health in the six weeks following resection before closure of the enterostomy opening. Considerable gain in weight may be expected, and one patient in our series gained 40 pounds in this interval.

The best results obtained in the surgical management of patients with regional ileitis have been those following resection of the involved loops of bowel. Certainly palliative operation does not accomplish this, and secondary operation may prove to be necessary later, as occurred in one of our patients who had had a previous ileocolostomy, the disease process continuing in an involved loop of bowel until a successful resection was carried out. The course of all our patients who have had removal of the involved segments of bowel has been followed at intervals regularly since operation, and in the majority of cases there has been complete restoration of health.

Recurrence of the disease has been noted in 2 patients. One was a young man whose case possibly should not be classified as a recurrence because the extent of the involvement precluded removal of all the involved bowel. A considerable portion of the ileum (150 cm.) was removed at operation, but other mildly affected loops of bowel were also noted at operation and could not be resected because of the extent of the lesion. The lesions that were left intact were minimal and were characterized by some thickness of the bowel wall by hyperemia and by small lymph nodes in the mesentery. The chief symptom has been mild abdominal discomfort, which has been controlled very satisfactorily by diet. The patient has gained in weight, has apparently remained in good health under medical management and has maintained a satisfactory weight level. Recurrence following resection took place in a young Jewish woman whose symptoms were chiefly those of mild abdominal discomfort accompanied occasionally by

three or four bowel movements a day. With the exception of the continued discomfort and diarrhea, her general health has been excellent. Her course was followed over a period of four years following resection. She was finally submitted to secondary operation because roentgenographical examination showed fresh involvement of the terminal ileum. At operation resection again was necessary, with removal of the terminal 60 cm of the ileum, establishing an ileocolostomy with the transverse colon.

We believe that the operative risk is considerably reduced by using the two-stage method of resection. No death has resulted following radical resection in our hands.

SUMMARY

Forty-eight cases of regional ileitis observed over a period of seven years are reported.

Twenty-nine patients were operated on, with 2 deaths following operation.

Resection of the involved loops of intestine was performed in 22 patients without a fatality.

It is our opinion that the two-stage method of resection is the operation of choice. Extensive resections employing the Mikulicz plan were used in 17 cases, with uneventful convalescence in every case.

Recurrences are probably associated with incomplete removal of the affected bowel, and for this reason we advocate wide excision of the affected loop. We believe that the cecum should be removed in all cases in which the terminal ileum is involved.

605 Commonwealth Avenue.

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MASSACHUSETTS MEDICAL SOCIETY

PROCEEDINGS OF THE COUNCIL

Stated Meeting, February 7, 1940

A STATED meeting of the Council of the Massachusetts Medical Society was held in John Ware Hall, Boston Medical Library, 8 Fen way, Boston, on Wednesday, February 7, at 10.30 a.m. The President, Dr. Walter G. Phippen, Essex South, was in the chair, and 222 councilors were present (Appendix No. 1).

The Secretary presented the record of the meeting of the Council of October 4, 1939, as published in the *New England Journal of Medicine* issue of November 2, 1939. The President declared the record approved as published.

Obituaries of six councilors, who had died since the last meeting were read by the President as follows:

DR. J. FORREST BURNHAM of Lawrence died January 26 in his seventy-second year.

After attending Harvard University Dr. Burnham received his degree from the Harvard Medical School in 1901.

He was a member of the Council of the Massachusetts Medical Society from the Essex North District from 1920 to 1939. From 1914 to 1920 he was an alternate delegate and from 1920 to 1936 a delegate to the House of Delegates of the American Medical Association. He had served as secretary of the Essex North District Medical Society.

Dr. Burnham was secretary of the staff of the Lawrence General Hospital for many years and was a member of the Lawrence Medical Club and a fellow of the American Medical Association.

His widow survives him.

DR. WALTER A. LANE of Milton died January 21 in his sixty-eighth year.

He attended Dartmouth College and received his degree, cum laude, from the Harvard Medical School in 1899.

Dr. Lane was a fellow of the American Medical Association and a member of the New England Pediatric Society. He served as vice-president of the Massachusetts Medical Society in 1932 and 1933 as a member of the Committee on Public Relations from 1932 to 1937 and as a delegate to the House of Delegates of the American Medical Association in 1937. He had also served as president of the Norfolk District Medical Society.

He was a director and consultant of the Sharon Sanatorium and from 1906 to 1924 he had served as Milton school physician.

His widow, a son and a daughter survive him.

DR. CHARLES MOLINE, of Sunderland died November 15 in his sixty-fourth year.

Born in Motala, Sweden, he went to Sunderland when he was twelve years old. He attended Harvard University and received his degree from the Harvard Medical School in 1903.

He was a fellow of the American Medical Association

and was secretary of the Franklin District Medical Society for twenty years.

His widow and two daughters survive him.

DR. HARRY R. NYE, of Leominster died January 8 in his sixty-ninth year.

He received his degree from the University of Vermont College of Medicine in 1900. He was a member of the staff of the Leominster Hospital for twenty-seven years.

He was a fellow of the American Medical Association, had served as a member of the Committee on Public Relations of the Massachusetts Medical Society for several years and had been president of the Worcester North District Medical Society.

His widow and one son, Dr. Lucius S. Nye, survive him.

DR. DAVID D. PRATT of New Bedford, died January 29 in his fifty-ninth year.

He attended Dartmouth College and received his degree from the Harvard Medical School in 1906.

He had been a practicing physician in New Bedford since 1907. He was a fellow of the American Medical Association and a member of the New Bedford Medical Society.

His son and daughter survive him.

DR. THOMAS J. SCANLAN of West Roxbury died October 18 in his sixty-eighth year.

He attended Tufts College Medical School receiving his degree in 1903. At the time of his death Dr. Scanlan was chairman of the Board of Trustees of the Boston State Hospital. He had served as a member of the staff of the Boston Dispensary consulting surgeon at Deer Island Hospital, medical examiner for the City of Boston Law Department, member of the gynecological staff of St. Elizabeth's Hospital, chief consultant at the Foxboro State Hospital and surgeon at the Winthrop Community Hospital.

Dr. Scanlan was a fellow of the American Medical Association and of the New England Obstetrical and Gynecological Society.

His widow, a sister and two brothers survive him.

The Council stood in silent tribute to the memory of these men.

The report of the Auditing Committee (Appendix No. 2), signed by Dr. Ezra E. Cleaves, chairman, and Dr. Edwin B. Dunphy, was read by the treasurer, Dr. Charles S. Butler. It was voted to accept the report as presented.

The report of the Treasurer (Appendix No. 3) was presented by him and was duly accepted. On the motion of Dr. Charles E. Mongan, Middlesex South, the Council expressed its appreciation of the services of Dr. Butler in conserving the funds of the Society.

On motion of Dr. Butler, the Council voted

permission to reduce the book value of one security purchased twelve years ago, and for years in default, namely bonds of the Conveyancers Title Insurance and Mortgage Company

REPORTS OF STANDING COMMITTEES

Financial Planning and Budget

The report (Appendix No 4) was presented by the chairman, Dr John Homans, Suffolk. This report took the form of the budget recommended for the current year and mimeographed copies had been placed in the hands of every councilor. On motion of Dr Edward Mellus, Middlesex South, and after some discussion, it was voted to amend the budget by increasing the item of "returns to district societies" from \$4000 to \$5000. Following this the budget was approved as amended.

Membership

The chairman, Dr H Quimby Gallupe, Middlesex South, presented the report of the committee (Appendix No 5). During the discussion, two names were taken from the list of those to be deprived of membership. The report was then adopted recommending that eight fellows be allowed to retire, thirty-five be allowed to have their dues remitted, eight be allowed to resign, fourteen be allowed to change their districts without change of legal residence, and three be recommended for affiliate fellowship in the American Medical Association.

Arrangements

The report of the committee (Appendix No 6) was presented by the chairman, Dr Augustus Thorndike, Jr, Suffolk, and was duly adopted.

The dates set are May 21 and 22, in Boston.

State and National Legislation

The chairman, Dr Charles C Lund, Suffolk, made a verbal report. He stated that, since there is no state legislature in 1940, the committee has not been so busy as usual. One meeting had been held to take up a few items. A copy of the bill, presented to the United States Senate by Senator Wagner, of New York, is under study by the committee. This bill proposes to authorize the expenditure of \$10,000,000 in support of President Roosevelt's plan to establish small rural hospitals in areas where the need can be shown and where arrangements can be made for the support of such an institution. The report was accepted.

Public Health

The report (Appendix No 7) was presented by the chairman, Dr Francis P Denny, Norfolk, and was duly accepted.

The resolution previously submitted by Dr Henry M Landesman, Norfolk, was recommended for adoption by the committee and was approved by the Council (Vote 85 in favor, 42 opposed).

REPORTS OF SPECIAL COMMITTEES

Cancer

The chairman, Dr Shields Warren, Suffolk, presented the report (Appendix No 8), which was accepted by the Council.

Postgraduate Instruction

The report (Appendix No 9) was presented by the chairman, Dr Frank R Ober, Suffolk, and was accepted. The Council then voted to adopt the recommendations of the committee as to the continuation of its work.

Committee Appointed to Support an Appropriation by Congress for the Construction of a New Building to House the Army Medical Library and Museum

In the absence of the chairman, Dr Henry R Viets, Suffolk, the report (Appendix No 10) was read by the Secretary and was accepted by the Council.

Committee to Study the Practice of Medicine by Unregistered Persons

The report (Appendix No 11) was presented by the chairman, Dr Richard Dutton, Middlesex East. It was voted to accept the report.

Dr Edward A Adams, Worcester North, moved that a copy of the report be sent to the Governor.

During the discussion which followed, Dr Charles C Lund, Suffolk, complimented the committee on its work but called attention to certain other phases of the problem. He stated that chiropractors, trichologists and others are advertising and practicing medicine. In his opinion the Board can do nothing to correct this evil without a large increase in its appropriation and a reorganization of the Board itself. He stated that the Public-Health Committee of the legislature recognized the need for more money for the Board but believed that the physicians must raise this money themselves. He expressed the hope that the committee would continue active and would go into other aspects of the situation. He pointed out that the report of the expenditures of the Board does not include all money spent by the Commonwealth since there are people who work for the Board and who are paid from other funds.

It was finally voted to adopt the report of the committee and to send a copy to the Governor. The chair announced that the committee would be continued.

Public Relations

The report (Appendix No 12) was read by the secretary of the committee, Dr Elmer S Bagnall, Essex North

Following the reading of the report, the Council went into executive session and discussed the report in detail. After the executive session was declared dissolved by the President, the Council voted to accept the report of the committee.

Discussion was resumed. In the opinion of some councilors the acceptance of the report and the adoption of the recommendations would at the same time indicate the approval of the Society of the conclusions on which the recommendations were based. The President ruled that this was the case.

Dr J Harper Blaisdell, Middlesex East, assumed that if the vote was passed the Council would there by express disapproval of the present plan of Health Service, Inc. but stated that the committee of five would have to consider it or any other plan which was brought to its attention.

Dr Nathaniel W Faxon, Suffolk, stated that a plan should not be condemned until it had been tried. He pointed out that many other plans had been prejudged and found lacking, whereas when put into operation they were successful.

The President pointed out that the Committee on Public Relations had decided to recommend the appointment of the committee so as to prevent prejudgment on any plan.

Dr Michael A Tighe, Middlesex North, pointed out that the recommendations of the committee were based on certain conclusions. He stated that no committee could assume the responsibility of policy-making for the Society, since this is a duty of the Council. He called attention to certain misinformation which had been rather widely circulated with reference to the American Medical Association. He stated that the Judicial Council of the American Medical Association had ordered the California State Medical Association to restore membership to certain individuals because the proper procedure had not been followed in the action taken to expel these individuals. The real issue concerning ethical practice had not been tried by the American Medical Association.

Various motions were proposed and amendments suggested. The Council finally called for the question on the original motion and voted to adopt the recommendation contained in the committee's report.

The Council recessed for the Cotting Luncheon from 1.30 to 2.30 p.m.

Restoration to Fellowship

Two restorations to fellowship (Appendix No 13) were authorized by the Council.

New committees to consider restoration for five fellows (Appendix No 14) were appointed by the President and confirmed by the Council.

APPOINTMENT OF DELEGATES

The President next introduced the matter of appointing delegates to the House of Delegates of the American Medical Association for two years beginning June 1, 1940.

On motion of Dr Edmond F Cody, Bristol South, Dr Phippen was placed in nomination as one of the delegates from Massachusetts. The President announced the nomination of delegates and alternates as follows:

| <i>Delegates</i> | <i>Alternates</i> |
|--------------------------------------|--------------------------------------|
| David D Scannell, Norfolk | Elmer S Bagnall Essex North |
| Dwight O Hara Middlesex South | Arthur W Marsh Worcester |
| Charles E. Mongan Middlesex South | Michael A. Tighe, Middlesex North |
| Walter G Phippen Essex South | John L. B. Vail Barnstable |

It was voted to close the nominations and to declare those named above as duly elected (See last paragraph under "Incidental Business").

The chair then nominated the following fellows as delegates to the meetings of the other New England state societies:

| | |
|----------------------|------------------------------------|
| <i>Maine</i> | Harold G Giddings, Middlesex South |
| | Olin S Petungill, Essex South |
| <i>New Hampshire</i> | Charles S. Benson, Essex North |
| | Edward A. Adams, Worcester North |
| <i>Vermont</i> | Peer P Johnson, Essex South |
| | John G Adams, Essex South |
| <i>Rhode Island</i> | J Frank Donaldson, Essex South |
| | Henry F Dauphin, Bristol North |
| <i>Connecticut</i> | Clarence E. Burr, Bristol South |
| | George L. Schadt, Hampden |

The Council voted to confirm the nominations and to elect the nominees.

On motion of the President, Dr Alexander S Begg, Norfolk, was selected as delegate to the Annual Congress on Medical Education and Licensure of the American Medical Association, to be held at the Palmer House, Chicago, February 12 and 13.

CONFIRMATION OF APPOINTMENTS

Confirmation of ad interim appointments was authorized by the Council as follows:

| |
|---|
| Dr Frank H. Lahay — Chairman, Committee on Publications |
| Dr William B. Breed — Member, Committee on Publications |

- Drs Halstead G Murray and Thomas L Shipman — Members, Committee on Industrial Health
 Dr Henry C Marble — Member, Committee to Consider Expert Testimony
 Dr Henry E Gallup — Member, Committee on Convalescent Care
 Dr Richard P Stetson — Voting member, Associated Hospital Service Corporation of Massachusetts
 Dr Roger I Lee — Councilor, Suffolk District
 Dr Robert W Buck — Councilor, Middlesex South District
 Drs Henry M Emmons and Norman A Welch — Councilors, Norfolk District
 Dr Frank M Howes — Councilor and Supervising Censor, Bristol South District
 Dr Carl C Persons — Censor, Bristol South District

INCIDENTAL BUSINESS

Dr Elliott P Joslin, Suffolk, called the Council's attention to a previous vote (October 7, 1936) empowering the President to appoint a committee of fellows who would have power to act on behalf of the Society in an advisory capacity to any medical school or college and to help direct such institution's efforts to develop and improve its facilities for teaching. In connection with this vote he reported on certain negotiations with Middlesex University School of Medicine. He referred to his address to the Society at the Worcester meeting and stated that subsequently he had received a request from the Middlesex University School of Medicine to become a member of the board of trustees and that he had declined the appointment. He likewise referred to his letter which was published in the *New England Journal of Medicine*, setting forth certain conditions which he thought ought to be fulfilled by the institution in question. He stated that the alumni of the school had publicly accepted the responsibility and that the president of the university had subsequently accepted the conditions. He informed the Council that this institution had fulfilled certain of the conditions laid down and that it is now in the process of endeavoring to secure the teaching beds required. He proposed that the President appoint a committee to consider the present situation at Middlesex and report at the next meeting of the Council with the possible submission of certain names for consideration for nomination to trusteeship of the Middlesex University School of Medicine.

Dr Joslin's motion was duly seconded. It was pointed out by Dr Butler that the Massachusetts Medical Society had no part in the selection of trustees to the boards of any of the other medical schools in the state and he questioned the advisability of establishing this precedent.

Dr Brainard F Conley, Middlesex South, questioned the advisability of taking action when the

institution had not as yet been acted on by the approving authority authorized by the state legislature.

Dr Lund pointed out that the American Medical Association has machinery for evaluating medical schools and that he did not believe it wise for the Society to adopt this type of co-operation at the present time.

Dr Charles E Mongan, Middlesex South, pointed out that many of the councilors had not returned to the meeting after luncheon and that he would be reluctant to see a vote without a thorough discussion before a larger number. He therefore moved that the recommendation be placed on the table for the next regular meeting of the Council. This motion was duly passed by the members present.

Dr Elmer S Bagnall, Essex North, called attention to the difficulties which occur in many localities in the administration of medical care for welfare recipients, old age recipients and veterans. He referred to the recent instance in Lawrence where it appears that irregularities and injustices had occurred. He therefore offered a resolution (Appendix No 15). After considerable discussion the chair ruled that the resolution should be referred to the Committee on Public Relations for further study.

Dr Edmond F Cody, Bristol South, introduced a resolution (Appendix No 16) which was adopted at the annual meeting of the Bristol South District last May. After some discussion it was moved to lay the matter on the table. This was confirmed by vote.

Dr Arthur W Marsh, Worcester, asked that his name be withdrawn as an alternate delegate to the House of Delegates of the American Medical Association because of physical disability. The President announced that he would abide by Dr Marsh's request and that he would appoint an alternate at a later date. (Dr Ernest L Hunt, Worcester, was appointed by the President following the meeting.)

The meeting adjourned at 3 15 p m

ALEXANDER S BEGG, *Secretary*

APPENDIX NO 1

ATTENDANCE

BARNSTABLE

C H Keene
 D E Higgins
 W D Kinney

BERKSHIRE

I S F Dodd
 John Hughes
 C F Kernan

BRISTOL NORTH

R M Chambers
 W H Allen
 F H Dunbar

BRISTOL SOUTH

Thomas Almy
 G W Blood
 R B Butler

E. F. Cody
J. A. Fournier
E. D. Gardner
H. E. Perry
C. C. Trapp
P. E. Truistdale

E. A. Payne
C. M. Roughan
M. A. Tighe

MIDDLESEX SOUTH

Dwight O'Hara
C. F. Atwood
E. W. Barron
W. B. Bartlett
Harris Bass
E. H. Bigelow
G. F. H. Bowers
R. W. Buck
E. J. Butler
B. F. Conley
D. F. Cummings
C. H. Dalton
H. F. Day
D. C. Dow

A. W. Dudley
H. Q. Gallupe
F. W. Gay
H. G. Giddings
H. W. Godfrey
W. G. Grandison
A. D. Guthrie
A. M. Jackson
A. A. Levi
A. N. Makechnie
R. A. McCarty
J. A. McLean
Edward Mellus
C. E. Mongan
J. P. Nelligan
E. J. O'Brien
L. S. Pulcher
Max Ritvo
E. S. A. Robinson
E. F. Ryan
E. J. Sawyer
M. J. Schlesinger
W. N. Secord
E. W. Small
H. P. Stevens
H. W. Thayer
R. H. Wells
M. W. White
W. S. Whittmore

NORFOLK

J. D. Adams
F. J. Bailey
J. R. Barry
A. S. Begg
M. I. Berman
D. N. Blakely
G. F. Blood
Myrtelle M. Canavan
F. S. Cruickshank
William Dameshek
F. P. Denny
G. L. Doherty
D. G. Eldridge
H. M. Emmons
C. B. Faunce, Jr.
J. C. V. Fisher
L. M. Freedman
Maurice Gerstein

W. A. Griffin
J. B. Hall
I. R. Jankelson
H. L. Johnson
C. J. E. Kichham
E. L. Kichham
H. M. Landesman
D. L. Lionberger
D. S. Luce
D. L. Lynch
F. P. McCarthy
F. J. Moran
M. W. O'Connell
Frederick Reis
D. D. Scannell
J. W. Spellman
S. H. Wener
N. A. Welch

NORFOLK SOUTH

D. B. Reardon
C. S. Adams
R. L. Cook
W. G. Curtis
W. L. Sargent

PLYMOUTH

J. E. Brady
P. H. Leavitt
D. W. Pope
W. H. Pulsifer
H. C. Reed

SUFFOLK

Reginald Fitz
J. W. Bartol
W. B. Breed
W. J. Brickley
W. E. Browne
C. S. Butler
E. M. Chapman
M. H. Clifford
Lincoln Davis
R. L. DeNormandie
A. B. Donovan
N. W. Faxon
G. B. Fenwick
Channing Frothingham
John Homans
A. A. Hornor
Rudolph Jacoby

E. P. Joslin
H. A. Kelly
T. H. Lanman
R. I. Lee
C. C. Lund
W. J. Mixer
J. P. Monks
R. N. Nye
F. R. Ober
F. W. O'Brien
J. P. O'Hare
L. E. Phaneuf
Helen S. Pittman
R. M. Smith
M. C. Soxman
Augustus Thorndike, Jr.
E. F. Timmins
S. N. Vose
Shields Warren
Conrad Wesselhoeft

WORCESTER

Gordon Berry
W. P. Bowers
L. R. Bragg
P. H. Cook
G. A. Dix
E. B. Emerson
G. E. Emery
J. M. Fallon
E. L. Hunt
E. R. Leib
W. F. Lynch
A. W. Marsh
J. C. McCann
J. W. O'Connor
W. C. Seelye
C. A. Sparrow
G. C. Tully
R. J. Ward
F. H. Washburn
R. P. Watkins
S. B. Woodward

WORCESTER NORTH

E. A. Adams
W. E. Currier
T. R. Donovan
C. B. Gay
J. C. Hales

ESSEX NORTH

H. F. Dearborn
E. S. Bagnall
R. V. Baketel
C. S. Benson
L. R. Chaput
P. J. Look
G. L. Richardson
F. W. Snow
L. T. Stokes
C. F. Warren
C. A. Weiss

ESSEX SOUTH

Horace Poirier
H. A. Boyle
C. L. Curtis
J. F. Donaldson
R. E. Foss
S. E. Golden
P. P. Johnson
J. F. Jordan
B. B. Mansfield
A. E. Parkhurst
W. G. Phippen
J. R. Shaughnessy
J. W. Trask

FRANKLIN

F. J. Barnard
H. M. Kemp
H. G. Stetson

HAMPSDEN

Frederic Hagler
W. C. Barnes
W. A. R. Chapin
J. L. Chereskin
A. J. Douglas
E. C. Dubois
G. D. Henderson
M. W. Pearson
A. G. Rice
G. L. Steele

HAMPSHIRE

J. D. Collins
L. N. Durgin

MIDDLESEX EAST

J. H. Blaisdell
Richard Dutton
E. M. Halligan
J. H. Kerrigan
A. L. MacLachlan
R. W. Sheehy
R. R. Stratton

MIDDLESEX NORTH

F. L. Gage
M. L. Ailing
A. R. Gardner

APPENDIX NO. 2

REPORT OF THE AUDITING COMMITTEE

The report of the examination of the books and accounts of the Massachusetts Medical Society for the twelve months ended December 31, 1939 made by Messrs. Hartshorn and Walter of Boston has been submitted to the attention of the Auditing Committee.

As the Auditing Committee, we have carefully examined the report of these certified public accountants, and approve the figures submitted by them.

EZRA E. CLEVELAND, Chairman
EDWIN B. DUNPHY

Hartshorn and Walter
Accountants and Auditors
50 Congress Street
Boston, Mass

The Auditing Committee

Dr Ezra E Cleaves

Dr Edwin B Dunphy

The Massachusetts Medical Society

8 Fenway

Boston, Massachusetts

Gentlemen

At the request of your treasurer, Dr Charles S Butler, we have examined the books and accounts of the Massachusetts Medical Society for the twelve months ended December 31, 1939, and submit herewith

SCHEDULE A Statement showing the balance sheet of the Massachusetts Medical Society, December 31, 1939

SCHEDULE B Statement showing the revenue and expenses of the Massachusetts Medical Society for the twelve months ended December 31, 1939

The cash on deposit in the banks has been reconciled with the bank statements. The cash receipts as recorded have been properly accounted for and disbursements are supported by vouchers or cancelled checks which were examined by us.

The securities and savings bank books in the various funds were examined by us or accounted for.

The accompanying balance sheet and related statement of revenue and expenses fairly present its position on December 31, 1939, and results of its operations for the year.

Respectfully submitted,

HARTSHORN AND WALTER

* * *

SCHEDULE A

STATEMENT SHOWING THE BALANCE SHEET OF THE MASSACHUSETTS MEDICAL SOCIETY DECEMBER 31 1939

| ASSETS | |
|---|---------------------|
| Fund Securities and Cash | |
| Endowment funds | \$22 166 87 |
| Building Fund | 58 099 15 |
| General Fund | 109 211 62 |
| Special Fund (for medical instruction) | 700 00 |
| | <u>\$190 177 64</u> |
| Cash—New England Trust Company (special account) | 980 00 |
| Total | <u>\$191 157 64</u> |
| LIABILITIES | |
| Contribution from Commonwealth of Massachusetts (for special medical instruction) | \$700 00 |
| Deferred Income | |
| Booth rentals received (1940 annual meeting) | 980 00 |
| Fund Accounts | |
| Endowment Funds | |
| Shattuck Fund | |
| G C Shattuck 1854 1866 | \$9 166 87 |
| Phillips Fund | |
| Jonathan Phillips 1860 | 10 000 00 |
| Cotting Fund | |
| B E. Cotting 1876-1881 1887 | 3 000 00 |
| | <u>22 166 87</u> |
| Building Fund | 58 099 15 |
| General Fund | |
| Balance, January 1 1939 | \$103,354 72 |
| Add unexpended revenue for the twelve months ended December 31 1939 | 5 856 90 |
| Balance December 31 1939 | <u>109 211 62</u> |
| Total | <u>\$191 157 64</u> |

ENDOWMENT FUNDS

| Phillips Fund | | | |
|---|---------------------|-------------------|---------------------|
| \$10 000 Commonwealth of Massachusetts 3 1/2 % Jan 1 1944 (reg) | 10 000 00 | | \$50.00 |
| Cotting Fund | | | |
| Deposit Institution for Savings in Roxbury No 45252 | 1 000 00 | | 0.00 |
| Deposit Provident Institution for Savings Boston No 1828 | 1 000 00 | | 0.00 |
| Deposit Suffolk Savings Bank Boston No 68364 | 1 000 00 | | 0.00 |
| Totals | <u>\$22 166 87</u> | | <u>\$616.25</u> |
| BUILDING FUND | | | |
| | Securities and Cash | Income | Premium Charged Off |
| Cash New England Trust Co Boston | \$5 514 50 | | |
| Deposit Framingham National Bank Savings Dept Book No 8592 | 369.38 | 9.01 | |
| Deposit Franklin Savings Bank Book No 172838 | 1 810 55 | 30.66 | |
| \$1 000 Blackstone Valley Gas & Electric Series C 4s Nov 1 1965 | 1 025 00 | 40.00 | |
| 1 000 Boston & Albany R R 1st Mtg Series A 4 1/2 % April 1 1943 (guaranteed) | 967.00 | 45.00 | |
| 1 000 Canada Dominion of 3s Nov 15 1968 | 972.00 | 0.00 | |
| 2 000 Central Illinois Public Service Co 1st Mtg Series A 3 1/2 % Dec 1 1968 | 2 010 00 | 70.00 | |
| 1 000 Central Pacific Ry Co 1st Ref. Mtg 4s Aug 1949 | 717.80 | 40.00 | |
| 1 000 Chesapeake & Ohio R R. (Craig Valley Branch) 1st Mtg 5s July 1 1940 | 1 012 50 | 16.11 | 17.50 |
| 1 000 Chicago Burlington & Quincy R.R. Co 4s Mar 1 1958 | 977.78 | 40.00 | |
| 5 000 C/D Chicago R 1 & Pacific Ry 1st Ref 4s Apr 1 1934 (in default written down) | 400 00 | | |
| 5 000 Conveyancers Title Insurance & Mortgage Co Part 1 Mtg 4 1/2 % Oct 31 1939 (in default written down) | 1 200 00 | | |
| 1 000 City of Quincy Mass 3 1/2 % May 1 1943 | 1 016 00 | 35.00 | |
| 1 000 Connecticut River Power Co 3 1/2 % Series A Feb 15 1961 | 1 045 00 | 37.50 | |
| 2 000 Joplin Union Depot 1st Mtg 4 1/2 % May 1 1940 | 2 039 00 | 55.17 | 31.00 |
| 1 000 Kansas City Mo 4 1/2 % Dec 1 1945 | 1 040 00 | 47.50 | |
| 2 000 N Y Central R R S P Sec 3 1/2 % Apr 1 1946 | 1 960 00 | 75.00 | |
| 1 500 N Y Chicago & St Louis R R Notes 6s Oct 1 1941 | 1 500 00 | 90.00 | |
| 1 000 Quebec Province of 3s July 15 1952 | 984.14 | 1.58 | |
| 3 000 Shell Union Oil Corp Deb 2 1/2 % July 1 1954 | 2,932.50 | 5.21* | |
| 500 Swampscott Mass Series D 3 1/2 % Sept 1 1942 | 520 00 | 17.50 | 10.00 |
| 1 000 Ticonderoga Pulp & Paper Co 1st Ref Mtg 6s Aug 1 1940 | 1 010 00 | 6.50 | 12.50 |
| 2 000 Toledo Edison Co 1st Mtg 3 1/2 % July 1 1968 | 2 030 00 | 70.00 | |
| 1 000 U S A Treasury Note Series A 1 1/2 % Mar 15 1941 | 1 000 00 | 15.00 | |
| 1 000 U S A Treasury 2 1/2 % Sept 15 1950-52 | 1 000 00 | 25.00 | |
| 2 000 U S A Treasury Bonds Reg 2s Dec 15 1950-48 (recpt) | 2 000 00 | | |
| 2 000 Virginian Ry Co 1st & Ref Mtg Series A 3 1/2 % Mar 1 1966 | 2 045 00 | 70.00 | |
| — Cincinnati Union Terminal 1st Mtg Series C 5s May 1 1957 | | 25.00 | |
| — City of Buffalo N Y 4 20s Sept 1 1929 | | 47.00 | 70.00 |
| — City of Fitchburg Mass 4s Aug 1 1939 | | 40.00 | 18.50 |
| — City of Pittsburgh Pa 3 1/2 % Apr 1 1939 | | 16.75 | 10.00 |
| — City of St Paul Minn 4s Feb 1 1939 | | 20.00 | 10.00 |
| — Commonwealth of Massachusetts 3s July 1 1939 | | 0.00 | 10.00 |
| — Dominion of Canada 3s Nov 15 1968 | | 0.64 | |
| Boston Medical Library Note 4 1/4 %, due Apr 1 1940 | 19 000 00 | 878.75 | |
| Additional subscription to Building Fund | | 1,177 | |
| Gift received from Dr Walter P Bowers | | 1 000 00 | |
| Totals | <u>\$58 099 15</u> | <u>\$3 041 50</u> | <u>\$134.50</u> |
| Less bond premiums charged off | | | 134.50 |
| Net income | | <u>\$2 907 00</u> | |
| Balance January 1, 1939 | | | <u>\$63 194.65</u> |
| Additions | | | |
| Income from securities | \$2 041 50 | | |
| Gift received from Dr Bowers | 1 000 00 | | |
| Profit on securities sold | 142.50 | | |
| Total | | | <u>3 184 00</u> |
| *Interest paid out | | | |
| NOTE The net income from Building Fund \$2 907 00 has been transferred | | | |

| | |
|---|-----------------|
| Deductions: | |
| Bond premiums charged off | \$134.50 |
| Bonds written down per vote of Council | |
| Conveyancers Title Insurance & Mortgage Co. | 3 800 00* |
| Chicago Rock Island & Pacific Ry | 4,335 00† |
| | <u>8,469 50</u> |
| Balance, December 31 1939 | \$58,099 13 |

Book value of \$5,000.00 written down to \$1,200.00.
 Book value of \$4,335.00 written down to \$400.00.

GENERAL FUND

| | Securities and Cash | Income | Permanently Charged Off |
|--|---------------------|---------|-------------------------|
| Cash, Merchants National Bank, Boston | \$15 072.33 | | |
| Cash, New England Trust Co., Boston | 11 788.29 | | |
| Deposit, Franklin Savings Bank, Book No. 35649 | 1 074.48 | \$21.48 | |
| \$3,000 Appalachian Electric Power Co. 4s, Feb. 1963 | 2,962.50 | 120.00 | |
| Atlantic Coast Line R.R. Co. 1st Cons. Mfg. 4s, July 1 1951 | 1,503.04 | 80.00 | |
| 2,000 Bethlehem Steel Corp. S. P. Series E 3 1/2% Oct. 1 1966 | 1,970.00 | 75.00 | |
| 3,000 Blackstone Valley Gas & Electric Co. Series D 3 1/4%, Dec. 1 1968 | 3,142.50 | 105.00 | |
| 1,000 Blackstone Valley Gas & Electric Co. Series C 4s, Nov. 1 1965 | 1,025.00 | 40.00 | |
| 2,000 Boston & Albany R.R. 1st Mtg. 4 1/4% Apr. 1 1943 (guaranteed) | 1,935.00 | 90.00 | |
| 1,000 Canadian Pacific Ry Equip. Trust Series C 3 1/4%, Dec. 1 1943 | 1,066.25 | 45.00 | |
| 2,000 Central Illinois Public Service Co. 1st Mtg. Series A 3 1/4%, Dec. 1 1964 | 2,010.00 | 5.00 | |
| 3,000 Central Power & Light Co. 1st Mtg. 3s, Aug. 1 1956 | 2,730.00 | 150.00 | |
| 1,000 Chesapeake & Ohio R.R. (Warm Springs Valley Branch) Gold 5s, Sept. 1 1941 | 1,035.00 | 6.44 | 10.00 |
| 900 Chicago, Burlington & Quincy R.R. Co. 1st Ref. Series A 3s, Feb. 1 1971 | 2,155.00 | 100.00 | |
| 1,000 Commonwealth of Massachusetts 3 1/2%, July 1 1940 (reg.) | 1,020.00 | 35.00 | 15.00 |
| 1,000 Commonwealth of Massachusetts 3 1/4%, Jan. 1 1941 (reg.) | 1,000.00 | 35.00 | |
| 2,000 Commonwealth of Massachusetts 3s, Jan. 1 1940 (reg.) | 2,026.67 | 29.17 | 30.00 |
| 1,000 Connecticut R.R. & Power Co. 1st 3 1/4% Series A Feb. 15 1961 | 1,045.00 | 37.50 | |
| 2,000 Consolidated Edison Co. of N. Y. 1st 3 1/4% Deb., Jan. 1 1958 | 2,035.00 | 70.00 | |
| Conveyancers Title Insurance & Mortgage Co. 4 1/4%, Dec. 1 1937 (in default) | 2,000.00 | | |
| 3,000 International Paper Co. Ref. Series A 6s, Mar. 1 1955 | 3 076.00 | 180.00 | |
| 2,000 Great Northern Ry. Co. Gen. Mtg. B 3 1/4%, Jan. 1 1952 | 1,932.50 | 110.00 | |
| 1,000 Great Northern Ry. Co. 1st & Ref. 4 1/4%, July 1 1961 | 990.30 | 42.50 | |
| 1,000 Great Northern Ry. Co. Gen. Mtg. Gold Series 1 3/4%, Jan. 1 1967 | 975.00 | 37.50 | |
| 1,000 Jones & Laughlin Steel Co. 1st Mtg. Series A 4 1/4%, Mar. 1 1961 | 970.00 | 42.50 | |
| 1,000 Koppers Company 1st & 2nd Trust Series A 4s, Nov. 1 1951 | 1,000.00 | 40.00 | |
| 1,000 Lone Star Gas Corp. 3 1/4% S. P. Deb. Aug. 1 1953 | 1 020.00 | 35.00 | |
| 2,000 Metropolitan R.R. Co. 1st Mtg. Series A 7s, Jan. 1 1954 | 2 100.00 | 140.00 | |
| 930 National Bondholders Corp. Par. Cof. (in default) | 930.00 | | |
| 2,000 New Brunswick, Province of, Deb. 3s, July 1 1944 | 2,000.00 | .33 | |
| 1,000 New Brunswick, Province of, Deb. 3 1/4%, July 1 1949 | 1 000.00 | 19 | |
| 1,000 N. Y. Central R.R. S. P. 3 1/4%, Apr. 1 1946 (secured) | 980.00 | 37.50 | |
| 1,000 N. Y. Chicago & St. Louis R.R. Co. 1st Mtg. 3 1/4%, extended to Oct. 1 1947 | 937.50 | 35.00 | |
| 750 N. Y. Chicago & St. Louis R.R. 6% Notes, Oct. 1 1941 | 50.00 | 45.00 | |
| 2,000 Ohio Edison Co. 1st Mtg. 4s, Sept. 1 1967 | 2,010.00 | 80.00 | |
| 1,000 Peoples Gas Light & Coke Co. 1st & Ref. Series D 4s, June 1 1961 | 975.00 | 40.00 | |
| 1,000 Pittsburgh, Cincinnati, Chicago & St. Louis Ry. Co. Series A 4 1/4%, Oct. 1 1940 | 1 030.00 | 45.00 | 18.75 |
| 1,000 Province of Quebec 3s, July 15 1950 | 995.37 | 1.58* | |
| 2,000 So. Pacific (Ore. Linn.) 1st Mtg. Series A 4 1/4%, Mar. 1 1977 | 1 605.00 | 90.00 | |
| 1,000 Texas Corp. 3 1/4% Deb., June 15 1951 | 1,000.00 | 35.00 | |
| 2,000 Texas Corp. 3s Deb., Apr. 1 1959 | 2,020.00 | 27.84 | |
| 1,000 Toledo Edison Co. 1st Mtg. 3 1/4%, July 1 1968 | 1 015.00 | 35.00 | |

| | | | |
|---|--------------|------------|----------|
| 2,000 Tidewater Assoc. Oil Co. S. F. Deb. 3s, Jan. 1 1952 | 1,997.50 | 70.00 | |
| 3 000 U. S. Cold Storage 1st Mtg. R. E. Gold 6s, Jan. 1 1945 | 3 000.00 | 160.00 | |
| 200 U. S. Treasury 3s, Oct. 15 1945-46 | 220.00 | 1.49 | |
| 2 000 U. S. Treasury 3s, Aug. 1 1941 | 2,000.00 | 65.00 | |
| 3 000 U. S. Treasury 3s, Oct. 15 1945-46 | 3 041.25 | 97.51 | |
| 1,000 U. S. Treasury 1st Series A, Mar. 15 1941 | 1 000.00 | 15.00 | |
| 3 000 U. S. Treasury 1st Series A, Mar. 15 1942 | 3 003.44 | 52.50 | |
| 1 000 The Virginian Ry. Co. 1st Lien & Ref. Mtg. Series A 3 1/4%, Mar. 1 1966 | 1,022.50 | 37.50 | |
| 1 000 Western Mass. Com. 3 1/2% Coupon Note, June 15 1946 | 1 012.50 | 32.50 | |
| 3,000 Willson Co. Inc. Series A 1st Mtg. 4s, July 15 1955 | 3 000.00 | 170.00 | |
| — New Eng. & Journal of Medicine | | 1.00 | |
| — American Tel. & Tel. Co. Deb. 3s, Dec. 1 1966 | | 8.67 | |
| — Canadian National Ry. Equip. Series J 4 1/4%, Mar. 1 1938 | 11.50 | 15.25 | |
| — Cedar Rapids Mfg. & Power Co. 1st Mtg. 5s, Jan. 1 1953 | | 100.00 | |
| — City of Buffalo Ref. 4.20% Sept. 1 1939 | | 42.00 | 5.00 |
| — City of Buffalo 2.60% July 1 1939 | | 52.00 | 25.00 |
| — Georgia Power Co. 1st Ref. 5s, Mar. 1 1967 | | 60.28 | |
| — U. S. Steel Corp. 3s, Deb., June 1 1948 | | 79.38 | |
| — Appalachian Electric Power Co. 4s, Feb. 1 1963 | | 52.89 | |
| — City of Medford Mass. Tax Note, Apr. 14 1939 | | 2.8 | |
| — North States Power Co. 1st Mtg. 3 1/4%, 1964 | | 29.47 | 9.87 |
| — Douglas Town Note, Nov. 15 1939 | | | |
| Totals | \$109,111.62 | \$3,347.40 | \$119.00 |
| Less bond premiums charged off | | 119.00 | |
| Net Income | | \$3,228.40 | |

| | | | |
|-------------------------------|-------------|--|-------------|
| Interest paid out | | | |
| Balance January 1 1939 | | | \$63 184 65 |
| Additions: | | | |
| Income from securities | \$ 2,041.50 | | |
| Gift received from Dr. Bowers | 1 000.00 | | |
| Profit on securities sold | 142.50 | | 3 184.00 |
| Total | | | \$66,368.65 |

| | |
|---|-------------|
| Deductions: | |
| Bond premiums charged off | 134.50 |
| Bonds written down per vote of Council | |
| Conveyancers Title Insurance & Mortgage Co. | 3,800.00* |
| Chicago Rock Island & Pacific Ry | 4,335.00† |
| | <hr/> |
| Balance December 31, 1939 | \$58,099.13 |

SCHEDULE B

Statement Showing the Revenue and Expenses of the Massachusetts Society for the Twelv. Months Ended December 31 1939

REVENUE

| | |
|---|-------------|
| Assessments Received by District Treasurers | |
| Barnstable | \$510.00 |
| Berkshire | 1,210.00 |
| Bristol North | 610.00 |
| Bristol South | 1,940.00 |
| Essex North | 2,170.00 |
| Essex South | 460.00 |
| Franklin | 470.00 |
| Hampden | 3,150.00 |
| Hampshire | 670.00 |
| Middlesex East | 1,160.00 |
| Middlesex North | 1,500.00 |
| Middlesex South | 9,299.11 |
| Norfolk | 7,905.00 |
| Norfolk South | 1,420.00 |
| Plymouth | 1,395.00 |
| Suffolk | 6,875.00 |
| Worcester | 4 050.00 |
| Worcester North | 1 020.00 |
| Assessments Received by Treasurer | \$47,969.11 |
| Non-Resident Assessments | 1,386.00 |
| Sale of Directory | 1,579.50 |
| Income from Funds | 16.16 |
| Endowment funds | \$616.25 |
| General Fund | 3 228.40 |
| Profit on Sale of Securities | 814.67 |
| Total Revenue | \$55,549.09 |

| EXPENSES | | |
|---|-------------|------------|
| Salaries | | |
| Secretary | \$3 000 00 | |
| Treasurer | 1 000 00 | |
| Executive Assistant | 2 499 97 | |
| Editor Emeritus of Journal | 1 200 00 | \$7 699 97 |
| Expenses of Officers and Delegates | | |
| President | \$52 52 | |
| Secretary | 1 755 78 | |
| Treasurer | 291 76 | |
| District treasurers | 2 596 77 | |
| Censors | 885 00 | |
| Delegates to American Medical Association | 778 70 | 6 360 53 |
| General Expenses | | |
| Maintenance of Society Headquarters (including clerical and other expenses) | \$4 120 56 | |
| Shattuck Lecture | 200 00 | |
| Cotting luncheons | 454 00 | |
| Standing committees | | |
| State and National Legislation | \$3 262 50 | |
| Public Health | 71 65 | |
| Medical Education and Diplomas | 68 47 | |
| Ethics and Discipline | 238 94 | |
| Public Relations | 488 85 | |
| Arrangements | 84.35 | 4 214 76 |
| Publications | | |
| New England Journal of Medicine | \$20 500 00 | |
| Annual Directory | 206 47 | 20 706 47 |
| Medical Defense | 850 90 | |
| Committee on Postgraduate Instruction | 835 84 | 31 283 53 |
| Refunds to District Societies | | 4 000 00 |
| Section of Obstetrics and Gynecology | | 135 41 |
| Section on Physical Therapy | | 98 50 |
| Miscellaneous Expenses | | 56 25 |
| Total Expenses | | 49 733 19 |
| Unexpended Revenue | | \$5 856.90 |

APPENDIX NO 3

REPORT OF THE TREASURER

In presenting the treasurer's report for 1939, there are several conditions in common with those of the past three years. One is the recurring difficult problem of investing and reinvesting safely the available funds of the Society. Another condition is the low rates of interest now to be obtained on prime bonds. A third is the growing feeling that prices for such securities have reached their peak. All these conditions have influenced the Treasurer and urged a conservative policy of investing our funds, having in mind the possibility of serious inflation with a consequent fall in prices of long term bonds. Also, a result of the above has been to oblige him to carry a larger cash balance than usual. Our policy should be, therefore, to try to be reasonably sure of the principal, and at the same time, expect only a moderate income return.

Revenue, in 1939, from resident annual dues amounted to \$49,355 the largest amount ever received from this source. The Society is growing in numbers of fellows. Non resident dues, in 1939, amounted to \$1559, so that the total of annual dues was over \$50,900. Additional income, received from invested funds (\$3844 65), from sales of the *Directory* (\$16 16), and from profits from securities matured and sold (\$814 67), combined amounted to \$4675 48. Hence, the total revenue of the Society (not including that of the Building Fund) in 1939 was \$55,590. Again, this is the largest sum ever received in a year by the Society.

Regarding the Building Fund, the Treasurer, in accord with a vote of Council, February, 1939, marked down

two items (for years in default) a total of \$8135. In 1939 the Fund received income of \$1907, a generous gift of \$1000 from a loyal friend and a small profit of \$142.50 from securities sold. The Building Fund now amounts to \$58,099 15, which represents more nearly its actual value.

Expenses of the Society for 1939 show a moderate reduction over 1938, and this reduction is due in large measure to your policy in not publishing yearly a *Directory of Fellows*, which resulted in a saving of \$1300, and to the less amount needed for expenses of delegates to the American Medical Association. Several committees, however, have spent considerably more than their budget allowances—a practice which the Treasurer hopes will be corrected in the future.

The Society ends 1939 with total assets, cash and securities, of \$191,157 64, showing, in spite of a write-off of \$8135, a small increase over 1938.

The Treasurer is glad of the opportunity to thank officers of the Society, the district treasurers and the office staff of the *New England Journal of Medicine* for their co-operation, and especially to thank his secretary for her continued help and loyal co-operation.

The Treasurer invites questions
CHARLES S BUTLER, Treasurer

APPENDIX NO 4

REPORT OF COMMITTEE ON FINANCIAL PLANNING AND BUDGET

The following appropriations are recommended for 1940

| | |
|--|----------|
| Salaries | |
| Secretary | \$3000 |
| Treasurer | 1000 |
| Executive assistant | 2500 |
| Editor of Journal emeritus | 1200 |
| Expenses of officers and delegates | |
| President and Vice-President | 500 |
| Secretary | 1500 |
| Treasurer | 450 |
| District treasurers | 2700 |
| Censors | 900 |
| Delegates to House of Delegates American Medical Association | 400 |
| Maintenance of Society Headquarters | 5000 |
| Shattuck Lecture | 200 |
| Cotting luncheons | 450 |
| Standing committees | |
| Arrangements | 1000 |
| Publications | |
| New England Journal of Medicine | 20 500 |
| Directory | 2000 |
| Membership | 10 |
| Financial Planning and Budget | 10 |
| Ethics and Discipline | 150 |
| Medical Education and Medical Diplomas | 200* |
| State and National Legislation | 1000† |
| Public Health | 100 |
| Malpractice Defense | 2000 |
| Permanent Home | 0 |
| Special committees | |
| Postgraduate Instruction | 1000 |
| Physiotherapy | 0 |
| Public Relations | 500 |
| Special appropriation | 500 |
| Cancer | 0 |
| Section of Obstetrics and Gynecology | 200 |
| Industrial Health | 50 |
| Boston Better Business Bureau | 50 |
| Returns to district societies | 5000 |
| Delegates to Pharmacopeial Convention Washington D C | 200 |
| | \$54,270 |

*Including expenses of delegate to annual congress at Chicago and prize offered to interns in Massachusetts
†Including expenses of delegate to annual congress at Chicago

JOHN HOMANS, Chairman

APPENDIX NO 5

REPORT OF THE COMMITTEE ON MEMBERSHIP

The committee recommends

1 That the following named eight fellows be allowed to retire as of December 31, 1939 under the provisions of Chapter I Section 5 of the by laws

Allen Edwin H., Boston
 Heald, Charles G., East Pepperell
 Landry Joseph N., Everett, with remission of dues for 1937 1938 and 1939
 Latham Benoni M., Mansfield, with remission of dues for 1939
 Maxfield George H., State Farm
 O Neil, Richard F. Boston
 Pratt, Charles A., New Bedford
 Swan Roscoe W., Holden

2. That the following named eight fellows be allowed to resign as of December 31 1939 under the provisions of Chapter I, Section 7 of the by-laws

Dexter Milton A., La Jolla, California
 Edwards, Hugh S., Atlanta, Georgia
 Forkner, Claude E., New York City
 Kasanin Jacob San Francisco California
 Prandle, Clair G., Providence, Kentucky
 Russell Amy E., Mayville, Rhode Island
 Woodward, William C., Washington D. C.
 Young Ward Gouverneur New York

3 That the following named thirty-five fellows be deprived of the privileges of fellowship under the provisions of Chapter I Section 8 Clauses a and b of the by laws

Abate, Frank J. Charlestown
 Abrahams, Edward T. Piusfield
 Ascolillo Hugo V., West Somerville
 Beaulieu Elmer J. Whitman
 Buckley James T. Worcester
 Butler Alfred W. Watertown
 Carella Joseph J., Quincy
 Coburn Fordyce, Wilton, New Hampshire
 Corbett, John R., Melrose
 Darrah Lee W. Northampton
 Gant, Julian C. Boston
 Hanlan, David E., Hyde Park
 Hill, William R. Philadelphia, Pennsylvania
 Israel Cyril Woonsocket, Rhode Island
 Keenan, James A. Roxbury
 Lovesey Burton E., Boston
 McClelland, Willis B. Franklin, Pennsylvania
 McNally, Daniel R., Pawtucket, Rhode Island
 O'Brien, Francis E. Haydensville
 O'Leary Joseph J. Newton
 Pappas, James P., Fort Adams, Rhode Island
 Phillips Richard B., Rochester, Minnesota
 Poluner Saul R., Camden, Maine
 Ritter Henry Springfield
 Salerno, Louis F., East Boston
 Schultz, Robert V., New York City
 Shine, Honora K., Holyoke
 Sullivan, John J., Dorchester
 Sumberg Norwood Elizabeth H., Monmouth Maine
 Talkington, Perry C., Philadelphia Pennsylvania
 Tiede, Joseph W. Dedham
 Walker John H., Muskogee, Oklahoma
 Walsh, Patrick H., Fall River
 Weiner Simeon, Worcester
 Weissman, Herman J. Rockland Maine

4 That the following named fourteen fellows be allowed to change their membership from one district society to another without change of legal residence, under the provisions of Chapter III Section 3 of the by law

From Essex North to Essex South
 Sidwell Doris M., Georgetown

From Middlesex East to Essex South
 Flockton Priscilla, Saugus

From Middlesex East to Middlesex North
 Payne, Edward A. North Woburn

From Middlesex South to Norfolk
 Browder Newton C., Somerville
 Parvey Benjamin Brighton

From Middlesex South to Suffolk
 Edwards, Edward A. Newton
 Garrey Walter E. Cambridge
 Miller R. Bretnay Cambridge
 Scudder Charles L. Brookline (formerly Sherborn)

From Norfolk to Middlesex South
 Dalrymple, Sidney C., Brookline

From Norfolk to Plymouth
 Pearson Grosvenor B. Foxboro

From Norfolk South to Plymouth
 Buck William E. Randolph

From Norfolk South to Suffolk
 Whitney Edward T., Quincy

From Plymouth to Norfolk South
 Woodward, Appleton C. Stoughton

5 That the following named three fellows be recommended for affiliate fellowship in the American Medical Association

Chenery William E. Boston
 Felch Lewis P., Boston
 May James V. Watertown

APPENDIX NO 6

REPORT OF THE COMMITTEE OF ARRANGEMENTS

The Committee of Arrangements wishes to report that it has completed the program and plans for the forthcoming meeting of the Massachusetts Medical Society May 21 and 22, to be held in Boston at the Copley Plaza Hotel.

All the out-of-town guest speakers have accepted the invitation extended to them and the program has been completed.

The Committee of Arrangements is asking for a budget of \$1000 which should amply cover our needs this year

AUGUSTUS THORNDIKE JR. Chairman

APPENDIX NO 7

REPORT OF THE COMMITTEE ON PUBLIC HEALTH

The committee has continued its weekly broadcasts, "Green Lights to Health" on Wednesdays at 4 p.m. through the courtesy of WAAB. The program has been completed through March. There is a good demand for the mimeographed copies of these talks, and there is reason to believe that they are serving their purpose of educating the public in matters of health

A few months ago the President received a letter from one of the members suggesting that the Society, at the time of its annual meeting, provide an exhibition illustrating matters of health for the benefit of laymen. Such exhibitions have been held by the Illinois State Medical Society and a few other state and county societies under the name of "Hall of Health." These apparently have been very successful and have had a large attendance.

The subject was referred by the President to the Committee on Public Health. We have obtained considerable information as to the various 'Halls of Health' which have been held, and have discussed the advisability of the Society undertaking such a project. While on the whole we are favorably impressed with the idea, it seems to us a very large undertaking which would require long preparation in advance. Obviously there would not be time between this meeting of the Council and the annual meeting in May to get the necessary exhibits prepared.

It has seemed wise however, to bring this matter to your attention at this time—not for discussion or action now, but in order that the members may give the subject some thought before it is brought up at some subsequent meeting.

The expense to the Illinois State Medical Society for its 1939 "Hall of Health" was about \$1500, and there is every reason to believe that the expense to us would be no less. If the Society has that amount to spend on health education we ought to consider whether there are other methods which would yield larger returns from a similar expenditure.

At the last meeting of the Council the resolution of Dr. Landesman with reference to prenuptial examinations was referred to the Committee on Public Health. On this the committee submits the following report:

The committee recognizes the importance of the resolution submitted by Dr. Landesman. We feel that, in a premarital examination, interest should not be centered merely on the detection of syphilis and gonorrhea but should include a careful history and physical examination in order to establish a diagnosis of health or disease. Marriage and pregnancy present problems in many diseased conditions, and a knowledge of the facts by both contracting parties should be helpful in planning a successful marriage. We believe that both parties should be informed of the results of the examination.

The committee suggests the adoption by the Council of a resolution which is a slight modification of Dr. Landesman's, as follows:

RESOLVED, That in the opinion of the Massachusetts Medical Society all individuals about to be married should be required to have a thorough medical examination, including a serological test for syphilis, and the information obtained should be made available to both the contracting parties.

FRANCIS P. DENNY, *Chairman*

APPENDIX NO 8

REPORT OF THE COMMITTEE ON CANCER

The past year has seen continued satisfactory functioning of the educational campaign sponsored by the Massachusetts Medical Society and the Massachusetts Department of Public Health. Somewhat over 300,000 persons have been reached in this way. The average period of delay between onset of symptoms and beginning of treatment has continued to diminish.

It has been a fundamental part of the policy of the ed

ucational work in cancer that it should be done with the aid of physicians of the community where the work is going on. This policy has worked out satisfactorily in past years, and the co-operation of the various physicians has been so generous that it will be continued.

The system of consultation clinics at the state-aided cancer clinics has functioned satisfactorily and continued to prove popular, as evidenced by the large attendance of physicians at these meetings. It is planned that they be continued during the coming year.

The American Society for the Control of Cancer is studying the possibility of rather drastic changes in its organization in Massachusetts, feeling that the field of education is being better covered by existing agencies than they would be able to cover it. They are considering the possibility of building up an organization to raise funds for cancer research and to supplement the work of hospitals equipped for the care of indigent cancer patients.

A joint committee, consisting of representatives of this committee, the American Society for Control of Cancer, and the Massachusetts Department of Public Health, is editing a series of articles for a *Handbook on Cancer* which will be distributed without charge to the practitioners of the State. This will be financed in part by a federal grant and in part by the Massachusetts branch of the American Society for the Control of Cancer.

The month of April will again be set apart this year by presidential proclamation as a Cancer Control Month.

The committee wishes particularly to thank Dr. Herbert L. Lombard, director of the Division of Cancer, Massachusetts Department of Public Health, and a member of the Council, for his earnest and successful efforts to serve the interests of the practitioner of medicine and at the same time to aid him in caring more effectively for his patients.

FRANKLIN G. BALCH,
ERNEST M. DALAND,
CHANNING C. SIMMONS,
PHILEMON E. TRUESDALE,
SHIELDS WARREN, *Chairman*

APPENDIX NO 9

REPORT OF THE COMMITTEE ON POSTGRADUATE INSTRUCTION

The Committee on Postgraduate Instruction has continued to co-operate with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau in presenting extension courses. This past fall the courses were given in the following places:

| DISTRICT | PLACE |
|-----------------|-------------|
| Barnstable | Hyannis |
| Bristol North | Taunton |
| Bristol South | New Bedford |
| Essex North | Lawrence |
| Essex South | Salem |
| Middlesex East | Melrose |
| Middlesex North | Lowell |
| Worcester | { Milford |
| | { Worcester |
| Worcester North | Fitchburg |

Courses will be presented in the other districts this spring; a final report on the extension courses will be given at the meeting of the Council during the annual meeting next May.

The Executive Committee co-operated with representa

ties of the medical societies of Maine New Hampshire, Vermont and Rhode Island in organizing and presenting the second New England Postgraduate Assembly on October 31 and November 1 1939. An interesting program was given by the following guest speakers to whom we are greatly indebted:

Dr. Jesse G. M. Bullowa New York City
 Dr. Benjamin W. Carey Detroit
 Dr. Lewis A. Conner New York City
 Dr. Eldridge L. Eliason Philadelphia
 Dr. Albert C. Furstenberg Ann Arbor
 Dr. Roscoe R. Graham Toronto
 Dr. Charles C. Higgins, Cleveland
 Dr. Harvey B. Matthews, Brooklyn
 Dr. James S. McLester Birmingham
 Dr. Joseph Earle Moore, Baltimore
 Dr. Maurice C. Pincoffs Baltimore

The attendance at the assembly was 776 as follows:

| | |
|---------------|-----|
| Massachusetts | 630 |
| New Hampshire | 47 |
| Maine | 40 |
| Vermont | 23 |
| Rhode Island | 21 |
| Connecticut | 7 |
| New York | 2 |
| Venezuela | 2 |
| California | 1 |
| Iowa | 1 |
| Nova Scotia | 1 |
| Pennsylvania | 1 |
| Total | 776 |

The attendance last year (1938) was 925 the unusually inclement weather during the first day and night of the assembly no doubt accounted for the drop in registration. On account of this smaller attendance and some unusual expenses there was a deficit of \$835.84. This amount was charged to the account of the committee. In 1938 the assembly made a net profit of \$125.00 which was turned over to the treasurer of the Society. The committee believes that the assembly is a good idea and that it will not ordinarily run at a deficit as expenses can usually be kept within the budget.

The chairman and secretary attended the third annual meeting of the Associated State Postgraduate Committees, held at St. Louis on May 17 1939 during the annual meeting of the American Medical Association. A permanent constitution and bylaws were adopted at this meeting. The secretary of the Massachusetts committee will continue to serve as secretary of the national organization.

The Commission on Graduate Education provided the sum of \$350 to finance the organization expense of the Associated State Postgraduate Committees, and the funds of the Massachusetts Medical Society which were advanced for this purpose have been repaid in full with the thanks of the other state societies. The next annual meeting of this group will be held in New York City during the meeting of the American Medical Association in June.

The committee makes the following recommendations that the postgraduate extension courses and the teaching clinics be continued in co-operation with the government agencies, as has been done in the past and that the committee be instructed to continue its co-operative activity with the other New England societies in presenting an assembly next fall.

FRANK R. ORLER, *Chairman*
 LEROY E. PARKINS, *Secretary*

APPENDIX NO 10

REPORT OF THE COMMITTEE APPOINTED TO SUPPORT AN APPROPRIATION BY CONGRESS FOR THE CONSTRUCTION OF A NEW BUILDING TO HOUSE THE ARMY MEDICAL LIBRARY AND MUSEUM

The committee has been active and in communication with a number of individuals, particularly Colonel Harold W. Jones, the librarian of the Army Medical Library. His last communication to us in December indicated that he did not believe "that it will be wise for your committee to take any positive action until we can give you some definite lines on which to proceed." In view of this, we are awaiting further instructions from him. He indicates that similar committees have been formed throughout the country and that the Army Medical Library "appreciates the action of the Massachusetts Medical Society and will not delay giving you definite information in the near future."

HENRY R. VIETS *Chairman*

APPENDIX NO 11

REPORT OF COMMITTEE APPOINTED TO STUDY THE PRACTICE OF MEDICINE BY UNREGISTERED PERSONS

At the annual meeting of the Council last June it was voted to approve the following resolution recommended by the chairman of the Committee on State and National Legislation: "Resolved That the President nominate and the Council of the Massachusetts Medical Society elect a special committee to study and have corrected so far as possible the practice of medicine by unregistered persons."

At the regular meeting of the Council last October this committee was duly nominated and elected. At first, the three elected were reluctant to accept this appointment both individually and as a whole, as they had all been publicly recorded in the past four years as opposed to further legislation until the present laws were thoroughly tried out as their findings might be considered biased. Furthermore, "registered physicians" and "unregistered persons practicing medicine" are all under the direct supervision of the State Board of Registration in Medicine, a board under the appointment of the Governor and his council and in no way responsible, directly to the Massachusetts Medical Society. As the secretary of the Board of Registration well said before the Council in February 1937 "It is the duty of the Board under the police power of the State to protect the people of the Commonwealth. The duty of the Board is not to protect against physicians but against unqualified practitioners. Presumably they [the physicians] can protect themselves, but the protection the Board exercises is on behalf of the people of the Commonwealth."

However after a preliminary survey of the problem and with due recognition of its handicaps, the committee believes that there are definite simple, constructive suggestions to offer which it adopted, can be to the benefit of the Board of Registration the medical profession and especially the people of the Commonwealth and the committee is therefore submitting its findings.

This whole question has apparently been raised because the Board of Registration in its campaigns for more legislation during each of the past four years has been emphasizing to the public in its annual reports that they do not know who is actually practicing medicine in Massa-

chusetts, and it is impossible for the law enforcing body to restrict practice to registered persons. The result is that there are probably a thousand unlicensed persons [not physicians] in the State, who are practicing medicine in some form, and it may well be that a considerable number are practicing under the licenses of deceased physicians.

No provision is made by the statutes for keeping the list up to date." Such disturbing statements by the Board, which has had the responsibility for forty-five years of protecting the public against unregistered persons practicing medicine, has compelled the committee to ask why the Board thinks men are practicing on dead men's certificates, and why they think that one thousand out of a probable total of eight or nine thousand are unregistered. Such conditions, if true, not only reflect seriously on the whole medical situation in Massachusetts, but also on the Board itself. Is the alleged condition due to a lack of funds, a lack of laws, or to a lack of enforcement of the present laws?

In considering these questions, the committee has consulted the statutes, the reports of the Board since 1916, the records of many city and town clerks, various municipal police departments, the stenographic reports of the statements of the secretary of the Board before the Council in 1937 and also those of the chairman of the Board in 1939. They have also consulted the narcotic regulations of the Internal Revenue Department, and have inquired of 'detail men' who visit the physicians in the various communities throughout the State. This committee is not considering what other states do or do not do. It is not considering whether or not the requirements for registration are good, bad or indifferent. It is not considering what constitutes the practice of medicine. It is considering only why so many unregistered persons are said to be practicing medicine.

Is there a lack of funds? According to the Board and the committee believes the Board's opinion justified, it is hampered by too little money for the proper running of a well kept office. The Board has no inspector or investigator of its own. It has part of the time of one investigator, but his salary is paid by another board. The financial recommendations of the Board have been pared by the legislature, although its expenses have always been less than its receipts, but the members have apparently been unable to convince the budget commissioner, the legislature and the governor of their needs. The receipts have exceeded expenses by \$90,000 since the Board was established in 1894, and during the past four years the receipts have been \$5000 a year in excess of expenses each year.

It must be borne in mind that all the receipts of the Board go into the general funds of the State Treasury, and none whatever are earmarked for the special use of the Board. The Board is entirely dependent on the legislature for its appropriations.

It seems to be customary to expect such boards to be self supporting, but it surely should be desirable to provide this medical board with sufficient funds to run the department efficiently. The committee believes that the lack of money is a part of the problem.

Is there a lack of laws? The intent of the present laws is obvious. Roughly, anyone practicing medicine or holding himself out as a practitioner without certificate of registration by the Board of Registration is punishable by fine or imprisonment or both. Of course, anyone practicing on a deceased physician's certificate is seriously amenable to the general laws as well as to the special medical laws.

Not only does a physician have to register with the Board, but he also has to register with the city or town

clerk wherever he may have an office or offices. Fines for failing to do so are mandatory and not optional. Furthermore, the city and town clerks must notify the Board of Registration in Medicine within twenty four hours of such registration, and these town clerks are also subject to mandatory fines. And still furthermore, the Board 'is required to keep a record of the names of all persons registered by it and of all money received and disbursed by it, and a duplicate shall be open to inspection in the office of the State Secretary' (Chapter 112, Section 4). The committee believes the laws are ample and have plenty of teeth.

Is there a lack of enforcement of the present laws? The Board states in its 1936 report that it received seventy-three complaints and that five were against unregistered persons. In other recent years complaints were received but no mention is made as to whether any complaints were against the unregistered.

This committee has devoted considerable attention to finding out how well Chapter 112, Section 8, is enforced. This section says that "no person shall enter upon, or continue in the practice of medicine within the Commonwealth until he has presented to the clerk of the town where he has or intends to have an office or his usual place of business his certificate of registration as a physician of the Commonwealth." The committee has made this study because this section was adopted by the legislature in 1917 on the recommendation of the Board itself, and today, a copy of this section is given each newly registered physician by the Board when he receives his certificate—so it may reasonably be considered good law. The penalties for failure to register with the town clerk are mandatory on both physician and town clerk, and it ought to be much simpler for the local authorities to check their own communities than for the State House to check the whole state. Any physician not registered with the town clerk is practicing illegally. The members of the committee have visited the twenty-two clerks in the following cities and towns whose total population exceeds one million inhabitants, or about 25 per cent of the population of the State.

| | | | |
|-----------|---------|----------|------------|
| Andover | Everett | Newton | Somerville |
| Arlington | Lowell | Plymouth | Wakefield |
| Brockton | Lynn | Quincy | Winchester |
| Brookline | Malden | Reading | Woburn |
| Cambridge | Medford | Revere | |
| Chelsea | Melrose | Salem | |

They did not include Boston, believing that conditions in Boston could be just as readily investigated as those in the surrounding cities and towns. The committee also regrets its inability to visit places more removed from the metropolitan area, but believes the conditions would be the same. They found that every city or town clerk had a carefully kept file of all physicians who had registered with him. A goodly number have gone far beyond the legal requirements, indexing and assorting so as to make the information more available. One clerk, when told what other town clerks were doing in indexing, said that his office would at once prepare such lists, as he believed any well-kept office ought to have them. Another clerk refuses to recognize birth and death certificates of new physicians unless they have registered as required. All send their duplicate copies at once to the Board as required by law. Some little annoyance was found because the Board furnished no blank forms either with or without expense, but merely advised the clerks that they believed the required blanks could be obtained from the Library Bureau, a private concern. Books of ten blanks each cost over ten cents a name. Few, if any, of the clerks could

recall any information furnished or sought by the Board, and the public practically never consulted the lists although open to public inspection. The committee has only the highest praise for the accurate, careful courteous way in which the town and city clerks have handled all these registrations, which might seem useless and perfunctory as at present handled.

The committee has also consulted a goodly number of police departments. In no case had the police been informed by the Board of the lists of local physicians in the town clerks' offices, nor had the Board even asked their co-operation or called their attention to Section 8. In fact in answer to inquiry as to what their departments would do about complaints regarding unregistered physicians, they replied that the question had not been raised before but that there was either a good medical society or reliable physicians in the community whose advice they would seek. Few if any had realized that they could easily determine whether a person was practicing legally or illegally merely by consulting his own town clerk's records.

This committee also went over the duplicate list required by law to be filed in the secretary-of-state's office and open to public inspection. Although the Board has been functioning for forty-five years no lists of registered physicians were on file up to 1931. For the years 1931 to 1938 inclusive, the yearly registrations had been filed on letter paper single spaced, and all were filed one to six years late. No addresses followed any of the names. In two of these years, the names were listed alphabetically. There were no lists for 1939. Although these lists were by law open to public inspection, they had never been consulted. Perhaps this is because the Board says that for the convenience of the public the information is given out in its office. The secretary-of-state's office merely files what the Board furnishes, and has no responsibility for the contents. The committee believes that such chaotic lists need no further comment.

At the Board's office, the clerks readily looked up various cards but said they could not be inspected by the public unless they waited for an obtained permission from the secretary of the Board as the records were not for public use. The clerk in charge said that the Board had but one alphabetical list of names of applicants, names of interns and students and so forth all merged in one alphabetical list with the more than 18,000 physicians registered since 1894. The deaths and removals—probably 10,000—were not placed in separate lists. The office clerks were not allowed to show the duplicate returns made by the city and town clerks, although the originals in the city clerks' offices were open to public inspection. No list or cards were kept showing the physicians registered in each city and town.

The office force apparently also handles the registration of nurses, which is in the same office, the secretary of the medical Board being also secretary of the nurses Board. As the nurses Board examines fifteen hundred nurses annually collects annual fifty-cent fees from over nineteen thousand registered nurses and also collects nearly \$1000 for certified statements the work of the medical Board becomes rather insignificant, in quantity at least, as compared with the other work in this small office.

To summarize, this committee finds that the laws are adequate that the income of the Board has covered expenses by over \$5000 in each of the last four years and that the income since 1894 has exceeded expenses by \$90,000. In spite of this, the Board has not yet convinced the legislature and the governor of its need of more funds for a well-conducted office. The committee further finds that the city and town clerks and the local police have not been

called on to co-operate with the Board in seeing that the unregistered persons in their immediate communities are reported a problem in which local authorities would be especially interested.

The committee further finds that no useful lists of registered physicians are open to public inspection at the State House and that the Board has no lists of the physicians arranged by cities and towns.

It is probably now apparent what the suggestions of this committee must be. They are simple and inexpensive, and can be carried out without inconvenience to the medical profession. The suggestions merely use the present dormant laws.

As soon as the Board arranges its finances so as to provide adequate cataloguing systems and as soon as it does its part in generous co-operation with the local authorities, then it will almost at once automatically establish a list of the active physicians of Massachusetts. It will also have for its private use another file of the "unregistered." What disposition is to be made of this "unregistered group" which the Board has been seeking, is a problem for which the Board is held directly responsible by the statutes but the committee believes that this illegal group is less numerous and less important than reported.

The Massachusetts Medical Society has 5189 members, or two thirds of the physicians in the State. The committee believes the Council can be of real service to the Board by urging all district societies and all individual members to make sure that they are registered with their city and town clerks and that they re-register whenever they move their offices, even within the same city. Furthermore, the Massachusetts Medical Society has an enviable reputation of long standing for supporting public-health and medical legislation, and this committee believes the Council can with propriety respectfully urge the Governor and his council to give serious consideration to the financial needs of the Board of Registration in Medicine.

The committee in closing expresses its appreciation of the many courtesies shown it by officials of the Society by various departments at the State House, by all local municipal officials interviewed and by others who have made valuable suggestions.

BRAINARD F CONLEY

EDWARD F TIMMINS,

RICHARD DUTTON *Chairman*

* * *

The following information was compiled by the committee

| | |
|---|-----------|
| Population | 4,350,910 |
| Number of towns and cities | 355 |
| Number of towns over 5000 | 128 |
| Number of towns over 10,000 | 78 |
| Physicians registered by the Board up to February 2 1940 | 18,502 |
| Estimated number now in practice | 8,000 |
| Number of physicians in the State by the fifteenth edition of the <i>American Medical Association Directory</i> | 7,528 |
| Members of the Massachusetts Medical Society — 1939 | 5,189 |
| Members of the American Medical Association | 3,113 |
| Physicians examined for registration in 1938 | 603 |
| Physicians registered in 1938 | 206 |
| Accepted on examination of National Board in 1938 | 102 |
| Highest number of names examined without registering | 25 |

Highest number of times examined before registering
First diplomate of National Board registered in 1923
Number of diplomates registered annually from 1923 to 1938 (1-6 10-21-23-26-34-44 40 55 79 76 71-84 76-102)
Medical schools in Massachusetts
Harvard Medical School
Boston University School of Medicine
Tufts College Medical School
College of Physicians and Surgeons, Boston
Middlesex University School of Medicine
Massachusetts College of Osteopathy
Board of Public Health established in 1869 (this was the first state board of health established in the United States)
Board of Registration in Medicine established in 1894
Receipts of Board of Registration (1894-November 30, 1938) \$387,971 72
Expenses of Board of Registration (1894-November 30, 1938) 297,635 08
Excess receipts \$90,336 64
Receipts of Board of Registration for year ending November 30, 1938 \$14,353 00
Expenses of Board of Registration for year ending November 30, 1938 8,419 83
Excess receipts \$5,933 17
Extracts from the General Laws of Massachusetts Tercentenary Edition

CHAPTER 112

Section 4 The board shall keep a record of the names of all persons registered by it and of all money received and disbursed by it, and a duplicate thereof shall be open to inspection in the office of the state secretary. The board shall make an annual report, including a statement of the condition of medicine and surgery in the commonwealth.

Section 5 The board shall investigate all complaints of the violation of any provision of sections two to twenty three, inclusive, or of section sixty five, so far as it relates to medicine or chiroprody, and report the same to the proper prosecuting officers.

Section 8 No person shall enter upon, or continue in, the practice of medicine within the commonwealth until he has presented to the clerk of the town where he has, or intends to have, an office or his usual place of business, his certificate of registration as a physician in the commonwealth, or, if it is lost, a certified statement issued by the board, setting forth all the material facts in the original certificate, and a fee of twenty five cents. Thereupon the clerk shall record the name of the owner of said certificate or certified statement, together with the date of record upon blanks approved by the board, said blanks to be so arranged that a duplicate carbon copy shall be made at the time of the original record. He shall keep the original as a part of his official records and it shall be open to public inspection. He shall, within twenty four hours after such

22 recordings, forward the duplicate to the board. Whoever practices or attempts to practice medicine without complying with this section, or whoever submits to a town clerk a false or fraudulent certificate or certified statement, shall be punished by a fine of not less than five nor more than one hundred dollars, and any town clerk who refuses or neglects to comply with this section shall be punished by a fine of not less than five nor more than ten dollars.

APPENDIX NO 12

REPORT OF THE COMMITTEE ON PUBLIC RELATIONS

At a meeting of the Committee on Public Relations, held on January 17, 1940, after a full discussion by the seventeen members present, it was voted (with one dissenting) to make the following report to the Council.

The Committee on Public Relations has again considered the matter of prepayment medical service plans, including that offered by Health Service, Incorporated.

It believes that any scheme to provide prepayment against medical costs for illness should offer an opportunity for all duly qualified physicians to participate if they choose. Whether this is on a state, county, district or municipal basis is immaterial. It believes that free-choice of-physicians should be maintained in order to continue present personal relations between physician and patient.

We are deeply cognizant of the fact that many people are asking, some demanding, a plan or plans for budget sickness costs. We appreciate the effort of Health Service Incorporated, in this direction, but believe that the success of its plan is seriously jeopardized by failure so far to give due consideration to many principles which we consider fundamental.

We believe, however, that the whole matter of prepayment health insurance is so much in the public mind and so important that any scheme should not be condemned without more careful study and that a special committee should be set up to study it. This committee should study the whole subject of prepayment sickness costs.

WE THEREFORE RECOMMEND THAT A SPECIAL COMMITTEE OF FIVE MEMBERS OF THE SOCIETY BE APPOINTED BY THE PRESIDENT TO STUDY THE VARIOUS MEDICAL-COSTS INSURANCE PLANS AND TO ENDEAVOR TO CARRY OUT THE VOTE OF THE COUNCIL OF APRIL, 1939, TO WIT

Voted, that the Massachusetts Medical Society to the initiative in the formation of a corporation, not profit in character, which shall seek to pay the medical care costs of patients,

THAT THIS SPECIAL COMMITTEE FURTHER BE AUTHORIZED TO CONFER WITH ANY GROUP PROPOSING TO SET UP A PLAN FOR MEDICAL-COSTS INSURANCE,

THAT THIS SPECIAL COMMITTEE BE EMPOWERED TO EMPLOY LEGAL COUNSEL AND THAT FUNDS NOT TO EXCEED \$500 BE APPROPRIATED FOR THIS PURPOSE, AND

THAT THIS SPECIAL COMMITTEE SHALL REPORT TO THE COUNCIL THROUGH THE COMMITTEE ON PUBLIC RELATIONS

THE COMMITTEE FURTHER RECOMMENDS THAT PUBLIC RELATIONS RELATING TO THESE MATTERS BE UNDER THE DIRECTION OF THE PRESIDENT AND SECRETARY OF THE MASSACHUSETTS MEDICAL SOCIETY.

ELMER S BAGNALL, *Secretary*

APPENDIX NO 13

 REPORTS OF COMMITTEES APPOINTED TO CONSIDER
 RESTORATION TO FELLOWSHIP

Restoration to fellowship was recommended for the following former members

Gerard Cote Salem (Committee Charles L. Curtis,
 John G. Adams and Horace Poirier)

Hymen S. Queen, Brookline (Committee Frank S.
 Cruickshank, Charles J. Kichham and Frederick
 Reis)

APPENDIX NO 14

 COMMITTEES APPOINTED TO CONSIDER PETITIONS
 FOR RESTORATION TO FELLOWSHIP

The following committees were appointed to consider the petitions for restoration to fellowship of the following five former members

For Lionel M. Cole Pittsfield
 Maurice S. Eisner, Garvey Adeson and George M.
 Slipton.

For Paul R. Donovan Revere.
 Earle M. Chapman, Harold L. Musgrave and George
 L. Gately

For Roland O. Parris, Falmouth
 John I. B. Vail John P. Nickerson and Julius G.
 Kelley

For H. R. Record Quincy
 Cornelius J. Lynch, Cornelius A. Sullivan and Wil-
 liam J. MacCausland.

For Frank J. Vaccaro Pittsfield
 Harry H. Bard, Newell N. Copeland and Modestino
 Crisnetello.

APPENDIX NO 15

 RESOLUTION PRESENTED BY DR. ELMER S. BAGNALL

WHEREAS, There is considerable confusion among the members of the Massachusetts Medical Society as to their proper place in the administration of compensable medical care to recipients of relief under the various welfare laws of the Commonwealth and under the ordinances and regulations of the cities and towns of the Commonwealth now then be it

RESOLVED, That the president of the Massachusetts Medical Society appoint a committee of five fellows for the following purposes to assemble information, investigate, study and report to the Society as soon as may be, on the proper place of physicians in the administration of medical care to persons receiving Old Age Assistance, Soldiers Relief and all other forms of welfare or assistance provided for by law and to be compensated therefor by the city or town responsible for the furnishing of such aid, relief or welfare to said person.

APPENDIX NO 16

 RESOLUTION PRESENTED BY DR. EDMOND F. CODY

WHEREAS, Morbid anatomy is the foundation of medical knowledge and

WHEREAS, The lessons derived therefrom constitute a most powerful postgraduate study and

WHEREAS, The number of postmortem examinations now obtained both in hospitals and outside is deplorably small therefore, be it

RESOLVED That the Massachusetts Medical Society appoint a committee to study the subject with a view of petitioning the General Court to increase the facilities for postmortem examination by making available the services of one well-trained pathologist in each district of the Massachusetts Medical Society

REPORT ON MEDICAL PROGRESS

NEUROSURGERY

DONALD MUNRO, M.D *

BOSTON

THE passing of 1939 marks the end of an era in neurological surgery. Raised, under the aegis of Horsley and Kocher, from the field of experimental surgery to the dignity of an important surgical specialty under the world leadership of Cushing, it is now obliged to proceed farther along the road to maximum usefulness without the guidance of either an actual or titular head. The deaths of Frazier and Cushing and the retirement of Elsberg leave the direction of American neurosurgery to their many pupils. Coincidentally a significant change has taken place in its type and extent. Its scope is no longer limited to tumors of the central nervous system and pain in the face. It has become plebeian. Its greatest concern nowadays is with the effects of trauma, and its greatest asset is an increasing knowledge on the part of the general surgeon of his own possibilities and limitations in this particular field. Among other things, its practitioners, like the general surgeon, must be willing to consult with specialists in otology, rhinology, dentistry, ophthalmology, urology, neurology and orthopedics. They must have some knowledge of the fundamental physical processes, and must be prepared to deal with the ordinary preoperative and postoperative and emergency surgical problems as they arise. It is becoming increasingly apparent that the day of the neurosurgical giant who was omniscient in all the specialties has passed. A glance at the classified references at the end of this review emphasizes this, and re-emphasizes the equal necessity of realizing that neurological surgery today includes much more than the surgery of central-nervous-system tumors.

ANATOMY AND PHYSIOLOGY

Two papers on the circulation of the spinal cord should be studied in all their detail by every surgeon who deals with the spine and its contents. They are by Suh and Alexander¹ and Herren and Alexander,² and describe the architecture of both the arterial and venous circulations. Their demonstration of the importance of certain radicular arteries and veins cannot be overestimated. Attention should be called more particularly to those ventral arteries that accompany the third and fifth cervical, the tenth thoracic and the second lumbar roots, the dorsal arteries that accompany the sixth

thoracic and the third lumbar roots, and the veins that run with the fourth and fifth cervical, the first, fifth, eighth and ninth thoracic and the first and fifth lumbar roots ventrally, and the third cervical and first, ninth and twelfth thoracic roots dorsally. The significance of this knowledge in relation to thrombosis, root or tract section and cord injury is immeasurable. Of some importance also is a paper by Schajowicz³ on the microscopic structure and pathology of intervertebral disks in the young. The development and growth of these surgically popular structures are well presented from the histological point of view.

More and more attention is being paid to the maintenance of a proper water balance in all surgical patients. This is especially necessary in the neurosurgical group because of the maximum alterations produced in the cerebral circulation and intracranial pressure by what are often thought to be insignificant changes in fluid intake. However, there is as yet no completely satisfactory method of testing for the presence of fluid imbalance. I have demonstrated that toxic dehydration in craniocerebral injuries is invariably accompanied by a dropping of the intracranial pressure to artificially low levels, but this identifies only the late stages of the process. Elkinton, Gilmour and Wolff⁴ made a study of 10 surgical patients from the point of view of their water balance. As a result, they concluded that the "electrolyte and water balance in surgical patients may be evaluated fairly accurately by simultaneous determinations of hematocrit value, plasma protein, chlorides and carbon-dioxide combining power." The total base is approximated from the latter two figures. "Hemoconcentration is an indication of serious depletion of the extracellular water," and "a falling total-base concentration indicates extracellular base depletion." A simpler method is that recommended by Hopps and Christopher.⁵ They restudied the old McClure-Aldrich test in this connection, and in 7 cases found it to be "a sensitive and reliable index to the state of hydration" and "a useful guide to the optimal fluid administrations provided the electrolyte balance was taken into consideration." The test is done by the injection of 0.2 cc of an 0.85 per cent solution of sodium chloride intradermally at standard points through standardized equipment. Unquestionably, neurosurgeons and general surgeons doing neuro-

*Assistant professor of neurological surgery, Harvard Medical School; surgeon-in-chief for neurological surgery, Boston City Hospital.

logical surgery should pay greater attention to such fundamental work.

INJURIES TO THE CENTRAL NERVOUS SYSTEM

Craniocerebral Injuries

It can be taken as almost axiomatic that new surgical technical procedures will eventually prove to be rediscoveries. Strayer,⁶ in a fascinating article entitled "Augustin Belloste and the Treatment for Avulsion of the Scalp," traces back to 1696 the development of the so-called modern method of early trephination of the outer table in the treatment of a denuded skull. "Belloste's significant contribution was to state that small perforations of the outer table should be made at the primary dressing of the wound, thus entirely avoiding exfoliation or sequestration. Surgery of today, and more particularly that of the specialities, profits by such insults to its ego."

A study of the x-ray characteristics of fracture of the cranial vault and the probability of demonstrating these fractures has been made by Santagati in Italy. It emphasizes the essential and incontestable inaccuracy of this procedure and mentions such causes of diagnostic error as thickened wound edges, defects in the film, arterial and venous grooves, and supernumerary and usual suture lines; it might well have included the indispensability of stereoscopic visualization of the suspected area. A greater appreciation of the roentgenological possibilities and deficiencies in relation to the skull would be of material aid to both pathologists and roentgenologists.

Subdural hematomas continue to hold the interest of the neurosurgeon, almost to the exclusion of any of the other varieties of acute cranio-cerebral injuries. One of the more extraordinary side effects of this interest is the persistence with which certain authors draw sweeping conclusions from an entirely inadequate number of cases, and the willingness with which certain journals allow such authors the use of their pages. Were the subject anything but subdural hematoma, articles such as that written by Coblenz⁷ and published in *Surgery* and editorials such as that⁸ which appeared in the *Journal of the American Medical Association* would hardly be accepted. The solemn statement by the former of trite conclusions based on an experience that is limited to 14 cases cannot be justified and reflects on the author. This is the truer when one realizes that there are already in the American literature numerous more complete reports on the same subject. Moreover, the latter present conclusions based on individual experience with hundreds of cases.

On the other hand, the description of relapsing juvenile chronic subdural hematomas by Da-

vidoff and Dyke⁹ and Ingraham and Heyls¹¹ study of subdural hematoma in infancy and childhood are invaluable and should receive close attention. The former point out the danger, in children, of new bleeding into the sac of an old previously unrecognized cerebral subdural hematoma and describe the diagnostic criteria. The latter call attention to the fact that the membrane formed around subdural hematomas occurring during the stage of brain growth must, if possible, be removed, or at least split vertically and horizontally, if resultant pressure atrophy of the underlying cortex is to be prevented.

Three cases of traumatic enophthalmos have been reported by Rand and Reeves.¹² According to them, only 164 cases of this interesting and rare condition had been collected up to 1930. They believe that many slight examples of this condition escape observation, especially in the earlier stages. It must be differentiated from facial hemiatrophy, phthisis bulbi and microphthalmos. No treatment is of avail, and further recession occurs in many cases. Usually the visual acuity remains unchanged, but in a few cases vision becomes impaired even to the point of blindness.

In the past year the late effects of cranio-cerebral injuries have received attention. An outline of the care necessary during the convalescent period immediately following hospitalization has been described by Munro.¹³ Grant and Norcross¹⁴ have reviewed the problem of repair of cranial defects by cranioplasty, and recommend a modification of the König-Müller operation. This implies an osteoperiosteal homologous graft from the outer table of the skull. The article is well documented, and the important point is made that cranioplasty has definite indications (such as convulsive seizures and neurosis) beyond the closure of a defect. Heyman¹⁵ reports the results of 280 operations on 176 patients suffering from cerebral spastic paralysis. These cases were picked as suitable from a larger group of 1500. Surgery is used only in addition to and as supplementary to education, muscle training, occupational therapy and so forth. The paralyses were all the result of birth injuries. The procedures used were in general orthopedic in type, such as motor-nerve resection, tendon transplantation and arthrodeses. The end results were poor on the upper extremity and good on the lower. Munro¹⁶ considers the diagnosis and therapy of so-called post-traumatic neurosis. He emphasizes the indispensability of hospitalization previous to diagnosis and advice as to therapy, and holds that exploratory diagnostic trephination is not only justifiable but in many cases essential. An end result study of 47 such cases in which this procedure alone made possible the diagnosis of

REPORT ON MEDICAL PROGRESS

NEUROSURGERY

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More and more attention is being paid to the maintenance of a proper water balance in surgical patients. This is especially necessary in the neurosurgical group because of the maximum alterations produced in the cerebral circulation and intracranial pressure by what are often thought to be insignificant changes in fluid intake. However, there is as yet no completely satisfactory method of testing for the presence of fluid balance. I have demonstrated that toxic dehydration in craniocerebral injuries is invariably accompanied by a dropping of the intracranial pressure to artificially low levels, but this identifies only the late stages of the process. Elkinton, Gilmour and Wolff⁴ made a study of 10 surgical patients from the point of view of their water balance. As a result, they concluded that the "electrolyte and water balance in surgical patients may be evaluated fairly accurately by simultaneous determinations of hematocrit value, plasma protein, chlorides and carbon-dioxide combining power." The total base is approximated from the latter two figures. "Hemoconcentration is an indication of serious depletion of the extracellular water and 'a falling total-base concentration indicates extracellular base depletion.'" A simpler method is that recommended by Hopps and Christopherson. They restudied the old McClure-Aldrich test of this connection, and in 7 cases found it to be a sensitive and reliable index to the state of hydration and "a useful guide to the optimal fluid administrations provided the electrolyte balance was taken into consideration." The test is done by the injection of 0.2 cc of an 0.85 per cent solution of sodium chloride intradermally at standard points through standardized equipment. Unquestionably neurosurgeons and general surgeons doing neu-

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fect as amphetamine but less in amount when used alone, and enhances the effect of amphetamine when used in combination with it.

What is otherwise a most valuable paper by Coleman and Meredith⁴⁴ is spoiled by their attempt to analyze therapy and end results of all levels of spinal-cord injury at once, and more particularly by their statement that the immediate onset of total paralysis after a spinal-cord injury predicates and justifies the diagnosis of transection of the cord. This is not necessarily so, and ignores the well known effect of the presence of spinal shock in such injuries. I and doubtless many others have plenty of patients actively earning their own living who as the result of a cervical spinal-cord injury were totally paralyzed from the shoulders down immediately after their injury. Fractures of the atlas are studied in detail in a report made by Plaut.⁶ Unfortunately, the paper includes patients with and without associated cord injury, and is chiefly made up of reports of 99 cases extracted from the literature, there being only 6 of his own. However his statements that in recent years fatalities occurred in only 9 per cent of these fractures, and that an overwhelming majority of the patients recovered to full occupational activity, are encouraging. Watson Jones's⁴⁵ paper on the postural reduction of fractures of the spine should be read with a critical eye because, again, the cases with cord injury have not been sufficiently differentiated as to method of treatment and end results from those without it. Certainly my experience convinces me that such a rapid and forceful method of hyperextension as Watson-Jones advocates for the reduction of deformities in the thoracic and lumbar spines will lead to nothing but trouble if there is any significant cord damage associated with the bone lesion. George's⁴⁶ paper on 271 patients with spondylolisthesis and 42 with spondylolysis should be brought to the attention of surgeons interested in the effects of spinal injuries. He presents evidence "which tends to confirm the theory that the lesion in spondylolisthesis and spondylolysis is essentially a congenital developmental defect in the interarticular portion of the laminae of the involved vertebra rather than the result of trauma.

INFECTION OF THE CENTRAL NERVOUS SYSTEM

No essential change in the therapy of meningitis and brain abscess has developed during the past year. The problem of osteomyelitis of the skull has been summarized by Mosher⁴⁷ in an article that must be regarded at this time as the final pronouncement relative to this difficult and dangerous disease. This should be required reading for all

surgeons, and particularly for those specializing in nose and throat and neurological surgery. The importance and possibility of early diagnosis, the necessity for wide excision of the diseased bone, the inclusion in the excision of 2 to 4 cm. of what appears to be normal bone and the ultimate conservatism of what the operator thinks is unduly radical surgery cannot be emphasized too strongly or repeated too often.

The study of spinal infections has this year been concentrated on osteomyelitis of the vertebrae and its complications. Turner⁴⁸ reports 12 of his own cases and adds 71 from the literature. The mortality ranged from 50 to 70 per cent, and extension of the infection to the spinal canal (epidural spinal abscess) was an infrequent but fatal complication. As in uncomplicated epidural spinal abscesses, Turner notes the frequency of skin lesions as an etiologic factor. Active surgery, with drainage of the abscesses and removal of the accessible involved bone, is as essential as the later treatment that is designed to prevent deformities.

Cairns⁴⁹ in a study of 968 intracranial operations considers the incidence, cause and prevention of wound infection in the operating room. He re-emphasizes the harm of tissue necrosis caused by too tight sutures, inadequate blood supply caused by a too narrow pedicle in the flap operations and the seriousness of streptococcal droplet infection. The last should receive more attention than it has. As Cairns and others have stated, and as I have also found true in my own operating room, the ordinary non-impervious tightly fitting mask made of gauze and pulled tightly over the nose and mouth gives so little protection as to be more of a liability than an asset. On the other hand, Cairns reports prevention of this complication by the use of a mask in which cellophane is incorporated. This has been my experience also after five or more years of exclusive use of such a mask. The mask is made of two pieces of fine mesh gauze 10 inches square. Between them, and basted into place in such a way as to come in contact with one whole side and parts of two others, is stitched a piece of blue cellophane 9 by 6 inches. Blue cellophane is used because its visibility is greater against the white gauze and it can be sewed in place with greater ease. Nine inch tapes are sewed to each corner. The mask is put on with the cellophane covering the mouth and nose. The upper edge is pushed under the lower edge of the operator's glasses, if he wears them, and the upper tapes are carried over the ears, pulled tight and tied beneath the occiput. The tapes from the lower corners are tied loosely behind the neck in such a way as to cause the lower

unencysted fluid subdural hematoma is presented Gardner¹⁷ writes about encysted subdural hematomas as seen late after acute injury Both unencysted and encysted types are end results of previously unrecognized and untreated acute subdural hematomas The unencysted hematomas were made up—in the acute stage—of large amounts of cerebrospinal fluid and little if any blood, while the latter—in the same stage—were composed largely of blood with which was mixed little or no cerebrospinal fluid Because of their respective compositions, only the latter developed a membranous envelope, and of these, only the clots in which liquefaction took place faster than organization manifested themselves later as encysted

Spinal Injuries

The proper understanding and consequent proper care of the paralysis of the bladder that is associated with any significant degree of spinal-cord injury continue to be the most important factors in the attempts being made to reduce the mortality of spinal injuries The physiology was originally first adequately covered by Denny-Brown, and more recently has been restated by McLellan¹⁸ with certain modifications incident to disease of the nervous system This book repeats what had already been recognized by those with experience enough to justify their expressing an opinion on the subject, when the author states that paralysis of the bladder following nerve injury or disease passes through recognizable phases of physiologic activity on its way to recovery These phases are easily but exclusively identifiable by cystometry There can therefore be no excuse for such a statement as that made by Hinman,¹⁹ that the effect on micturition is retention, overflow, incontinence, automaticity and true incontinence If one is to write on a vital subject, such a failure to keep up to date is inexcusable, and is matched only by the author's extraordinary recommendation of non-catheterization with manual expression and cystostomy as the proper therapy for bladders of patients with spinal-cord injuries

The chance of non-infection of the bladder in spinal-cord injuries is so small as to be of no significance, and it can be accepted as fact that all such patients have a bacteriuria within seventy-two hours of the time of the injury, particularly if they have been catheterized This bacteriuria is harmless if residual urine is never allowed to collect and remain undisturbed Nevertheless, the neurosurgeon in charge must have some knowledge of modern chemical urinary antiseptics Ezickson²⁰ studied 25 patients with urinary sepsis whom he treated with sulfanilamide His best results

were in cases in which *Bacillus coli* and the streptococcus were found, and his failures were with *B. proteus*, Friedlander's bacillus and *B. pyocyaneus* He rightly insists that a complete urological study be carried out before administering the drug Schar²¹ reports some interesting and fundamental work on urinary antiseptics He studied the ability of the bladder of animals and of man to absorb and excrete various chemicals Among other things, he found that anesthetic substances, urine, water and the substances present in urine (especially urea) were able to pass through the bladder wall in both species All his experiments on man showed that an ulcerated bladder is capable of absorbing three times the amount absorbed by a normal bladder From these and other data he justly concludes that in choosing substances to be used for bladder irrigation or instillation, the toxicity, absorbability and concentration of the drug, as well as the capacity and condition of the mucous membrane, must be carefully considered A study of the effect of surgery on the pain of spastic infected bladders is reported by Nesbit and McLellan²² They demonstrated that sympathectomy relieved pain in such cases by controlling "the spasm of the internal sphincter and perhaps other parts of the bladder musculature" This is in agreement with Denny-Brown's and my findings that the presacral connections carry only sensation of pain and not other afferent stimuli Nesbit and McLellan hold that presacral neurectomy alone and without the additional exeresis of the lateral sacral sympathetic ganglionated chain will relieve as much pain as does the more extensive dissection This denervation, moreover, does not render the bladder insensitive to pain that originates from causes other than spasm of the vesicle outlet and detrusor mechanism Such conservative sympathectomy "should be resorted to in only those patients in whom that pain is clearly demonstrated to result from spasm of the vesicle outlet," and "was not shown to cure the lesions of Hunner ulcer" Surgeons who expect to change any other bladder activity or sensation by presacral neurectomy should consult this article and its bibliography before doing the operation Loman, Greenberg and Myerson²³ have produced a valuable paper on the effects of certain drugs on the urinary tract, with suggested clinical application They find that Mecholyl causes the kidneys, ureters and especially the bladder to contract. Prostigmin alone has no effect, but enhances the effect of Mecholyl Amphetamine (Benzedrine) gives exactly the opposite effect to that of Mecholyl, the kidneys, ureters and especially the bladder all relaxing and dilating Atropine has the same ef

Schnitzer, Cutler, Bailey and Vaughan⁴⁰ have written on the place of irradiation in chromophobe adenomas and acromegaly. They conclude that irradiation should be tried for the chromophil as well as for the chromophobe adenomas before surgery is used and unless there is imminent danger of permanent visual impairment. This conclusion re-emphasizes the best present-day opinion on this matter, and to it need only be added the warning that the surgeon-in-charge is lax if he does not require a patient undergoing such treatment to have his visual fields checked every six months or oftener. An authoritative and more general approach to this subject will be found in the series of research publications on an investigation of the most recent advances relative to the anatomy, physiology and general considerations of clinical importance of the pituitary gland. These are available in the form of a bound volume,⁴¹ and emanate from the Association for Research in Nervous and Mental Diseases.

Acoustic Neuromas

The problem of whether to do a total extirpation of an acoustic neuroma and give the patient a complete facial palsy or an intracapsular enucleation, leaving the innervation of the face intact but subjecting the patient to the certainty of a recurrence of the tumor, is still under discussion. Horrax and Poppen⁴² report in detail on a series of 35 cases. They advocate total extirpation on account of a lower operative and total mortality and because their mortality in the recurrent cases has been high. Gardner⁴³ and others subscribe to this point of view. Probably the best person to decide is the patient!

Spinal Tumors

The diagnosis and therapy of spinal tumors appear to be fixed. A paper by Boldrey and Elvidge⁴⁴ on dermoid cysts of the vertebral canal adds 3 cases to a collected total of 37. The cysts are slowly progressive and do not produce compression until the second, third or fourth decade. Since their removal is usually incomplete, they tend to recur. Pilonidal sinus is frequently associated with them. Horrax and Henderson⁴⁵ report a case in which there was an encapsulated intramedullary tumor which extended the whole length of the cord. To remove it required two operations—the removal of all spinous processes and laminae from the axis through the second lumbar vertebra, as well as the splitting of the spinal cord down the middle of its posterior surface for its full length. As the authors say, a single case report is usually valueless, but this case merits attention as much for the sake of the surgical procedure as for the tumor.

X ray Therapy

Uncertainty as to the possibilities and limitations of x ray therapy of brain tumors is so widespread that reports such as that written by Nessa⁴⁶ are of great value. He details the results obtained by irradiation in a series of 44 cases in which the diagnosis was proved by biopsy or necropsy. It would appear from this study that x ray therapy in certain cases of brain tumor may be distinctly helpful, and that the dosage should be materially increased.

PERIPHERAL NERVOUS SYSTEM

Aird and Naffziger⁴⁷ have published the results of some interesting work on the regeneration of peripheral nerves. The experiments were made on dogs and were well controlled. The results led these authors to believe that very satisfactory recovery of muscular function can follow the anastomosis of small proximal to large peripheral nerves, that synergistic muscle groups may be successfully reinnervated by the anastomosis of the nerve supplying one of those muscles to the peripheral portions of the nerves innervating both groups of the synergistic muscles, and that the flexor muscles of the leg showed a better functional result than the extensor. The widespread possible clinical application of this work—as in poliomyelitis—is obvious.

Nerve injuries associated with supracondylar fractures of the humerus in children were studied at the Boston City Hospital by Bailey.⁴⁸ He reports 71 such fractures seen in three years, with 6 cases complicated by nerve involvement. Four of the 6 cases had radial, 1 median and 1 radial median and ulnar nerve involvement. From a study of these cases Bailey concludes that the paralysis may occur either as the result of the fracture or from trauma during reduction, that the radial nerve is the most commonly affected, that it is usually not severed but rather contused, and that beginning return of function, if it is to occur, may be expected in the paralyzed muscles within eight weeks, with complete return in four to ten weeks. Reductions should be gentle, weakened muscles must be supported, physiotherapy instituted early and exploration of the nerve undertaken if no recovery of function is manifest within twelve weeks. In view of the fact that these cases are usually seen by either the general surgeon or the orthopedist, whose main interest is in the fracture, the importance of this paper can not be overestimated. The possibility of nerve injury in association with all fractures of the lower three fourths of the humerus should receive the same degree of attention that the possibility of nerve injury in association with the head of the

fibula does. Equal care should be taken in the application of circular splinting material, adhesive plaster, bandage and so forth, and an equal anxiety as to the possible deleterious effect of such splints should be exhibited at all times. Above all, no circular plaster should be put on these fractures without making provision at the time of application for a cock-up support of the wrist and hand, whether or not evidence of nerve injury is present. Exploration or repair of the nerves of the extremities should not be undertaken without a full knowledge of the technical requirements of such a procedure. Among the more essential of these is burial of the exposed part of damaged peripheral nerves, whether or not sutured, in muscular tissue, if later interference with return of function from scar contraction at the operative site is to be avoided.

The treatment of facial paralysis is well covered by Cleveland⁴⁹. He reviews the literature from 1932 to 1938, and covers all phases of this difficult problem thoroughly. He reaches no conclusions, however, and the reader must draw his own. Anyone having the responsibility of the treatment of facial paralysis should not fail to consult this article in detail before making up his mind as to the best therapeutic method to be applied to the individual case. Brown's⁵⁰ article on the utilization of the temporal muscle in the correction of facial palsy should also be consulted.

SYPHATHETIC AND PARASYMPATHETIC NERVOUS SYSTEMS

What used to constitute the bulk of neurosurgical literature has now simmered down to a number of articles that is commensurate with the practical possibilities of the surgery of the sympathetic and parasympathetic nervous systems. Among the most practical opportunities for therapy along this line is the modern treatment of hyperhidrosis of nervous origin, as described by White⁵¹. Such appropriate surgery returns to otherwise permanent invalids the power again to earn their living and to mingle freely with society. Its value cannot be overestimated. Meigs⁵² re-emphasizes the effect of presacral neurectomy on dysmenorrhea. He confirms my earlier observations that the effect of this denervation on bladder activity is nil if limited to the hypogastric plexus itself. While his conclusions in general are sound and should guide the application of this specialized operation, his description of the physiology of this plexus leaves much to be desired, and, as has recently been demonstrated, is wrong in many of its major concepts.

Denervation of the carotid sinus for the so-called carotid sinus syndrome has been described from

France by Léger⁵³. His suggestion that novocain be injected into the intercarotid notch before stripping the vessels is sensible. According to my experience, however, the length of vessel that Léger strips on either side of the fork is inadequate. His claim that the field of usefulness of this procedure embraces epilepsy (*sic*) is untenable, unless some more accurate diagnostic classification is used. His and Rovenstein and Cullen's⁵⁴ preoccupation with the type of anesthetic to use in these cases seems somewhat unnecessary. In 14 of my cases I have used ether given by the drop method on an open mask and usually preceded by a small dose of Avertin, and have had no difficulties of any sort. However, I am as opposed as are these authors to the use of local anesthesia in such cases.

A note by de Takats⁵⁵ on the use of acetylcholine as a diagnostic test in cases of megacolon deserves more attention than its length would apparently warrant. As a stimulant of the parasympathetic outflow, this use of acetylcholine will doubtless lead to a greater efficiency in the diagnostic and therapeutic study of large numbers of the diseases of the bladder and lower bowel.

VASCULAR SYSTEM

The elucidation of the problem of essential vascular hypertension proceeds, perhaps not apace, but rather in a slower and more orderly manner than heretofore. Heymans⁵⁶, in a short report, has a concise statement of his experimental approach to this subject. He includes his pertinent physiological findings as well as his own and his several collaborators' conclusions. He is refreshingly moderate and judicious in his statements. Surgically, a series of twelve cases is reported from France by Paliard and Étienne-Martin⁵⁷. Davis and Barker⁵⁸ describe their findings in a group of similar cases, as well as their experimental work on the combination of surgery and the therapeutic administration of potassium sulfocyanate. From the medical point of view, Robinson and O'Hare⁵⁹ also discuss potassium sulfocyanate therapy. So far as the individual patient with hypertension is concerned, methods that can be used for his relief will vary both in efficiency and in type with the enthusiasm of the doctor whom he consults. The more consultants he sees, the greater will be his conviction that essential vascular hypertension is as yet neither understood nor properly treated.

Aneurysms of the carotid circulation have come in for considerable attention during the past year. Dandy's⁶⁰ report of 3 intracranial cases that were successfully closed by trapping the aneurysm between a ligature of the internal carotid artery in the neck and a second ligature applied to the same vessel intracranially and distal to the aneurysm,

brought to light a number of other cases that have been successfully treated. Furthermore, the fact has been emphasized that a worth while series of cures have resulted from simple closure of the carotid artery in the neck. This however, should not be attempted unless sufficient pre-operative compression of the artery is carried out and unless the operator is certain of his diagnosis. Singleton⁶¹ has written an interesting paper on the arteriovenous type of intracranial aneurysm. His suggested use of sclerosing solutions in the dilated ophthalmic veins is, to say the least, stimulating. Robertson⁶² introduces a note of conservatism in the discussion, and emphasizes the need of preoperative preparation, as well as the successes that have followed the use of non-operative therapy in the past. In general it may be said that intermittent occlusion of the carotid artery in the neck should be practiced before any permanent closure is undertaken. This should be continued until occlusion can be maintained without symptoms for thirty minutes at a time.

All traumatic carotid and cavernous sinus aneurysms should be treated by ligation of the common carotid, to be followed by ligation of the internal carotid in the neck on the side of the aneurysm. Ligation of the ipsilateral and contralateral external carotids can be done before or after intracranial closure of the involved internal carotid and possibly, as Grant⁶³ suggests, intraorbital ligation of the ophthalmic veins in addition. Other types of aneurysm must still be dealt with as individual problems, and with the risks and benefits of therapy assessed separately for each patient.

PAIN

General

Within the last two or three years the injection of cobra venom has come into some use as a method of treating pain that cannot be prevented by other means. Its effectiveness seems to be unpredictable, and there has been need for a greater knowledge of how to use it. Rutherford⁶⁴ offers helpful suggestions along this line. In a carefully controlled series of 17 cases, 46 per cent of the patients were completely and 88 per cent were half relieved of their pain. Rutherford notes that if there is a favorable response it begins on the third or fourth day, and is complete by the sixth or seventh day after the injections are started. No increase in relief can be expected with an increase in dosage. In those relieved maintenance of relief was usually possible with an ampule every other day. The only objection to the use of this substance, so far as I have been able to determine, is the unpredictability of its effect and the expense.

Pitts and Browder⁶⁵ add further evidence relative to the efficiency of spinal subarachnoid alcohol injections for the relief of pain in properly selected cases. If possible, the injection should be so made as not to bathe the sacral roots. Care should always be taken to avoid injecting too large a quantity at any one time. The possibility of causing permanent dysfunction of the bladder and lower bowel, no matter how perfect the technic, should never be forgotten, and appropriate warning should be given the patient beforehand. Even at its worst, the procedure is a distinct aid to the therapeutic measures available for dealing with intractable pain.

Back Pain

Papers about back pain still deal almost exclusively with ruptured intervertebral disks and their protruded nuclei. Fincher,⁶⁶ under the general heading of low-back and sciatic pain reports his attempts to substitute air for Lipiodol in outlining the defect made by the protruded nucleus. In the last analysis, no more can be said today for the substitution of air for Lipiodol in the diagnostic study of these cases than this: it may be tried, but the resultant diagnoses have a very high percentage of error. A better paper that discusses the intraspinal causes of back pain is that by Bradford and Spurling.⁶⁷ They report on 60 cases which include examples of herniated nucleus and thickened ligamentum flavum. The cases have been well studied, and the data on them are unusually complete. Perhaps the best point that these writers make is the importance of studying the distribution of the Lipiodol in the axillary pouches so characteristic of the points of exit of the cauda equina. Preoperative recognition of lateral protrusions of the loose cartilage is possible by this means—a vital point in relation to diagnosis, and to operative technic as well. It cannot be doubted that the time has now arrived for surgeons to become definitely conservative in making the diagnoses of extruded nucleus pulposus and thickening of the ligamentum flavum if they do not wish to undo all the good that has been accomplished to date in dealing with cases of intractable sciatic and low-back pain. The diagnosis of herniation of the nucleus should never be made without symptoms that can be ascribed to irritation or compression of one spinal root, and at least a demonstration by Lipiodol of a characteristic defect at the proper point or an increased cerebrospinal fluid protein, preferably both. Operative interference should not be undertaken by the general or orthopedic surgeon. This operation except for any associated fusion, is a neurosurgical one and should be exclusively carried out by men qualified

in that line. Already much harm has been produced by inadequate and incorrect diagnoses and by the damage done by inept and ignorant operators. The diagnosis of significant thickening of the ligamentum flavum is even more difficult, and even less convincing at operation. It is significant that discussion of its presence has almost disappeared from the surgical literature during the past year. The profession must sedulously avoid making of these conditions, as was done in the past with "sacro-iliac strain," another diagnostic wastebasket.

Pain in the Face

Studies of facial pain during the past year have been chiefly concerned with fifth-nerve neuralgia. The usual crackpot types of suggestion, such as using typhoid vaccine as a therapeutic measure, have been made. A certain persistence in the belief in the efficiency of vitamin feeding as a treatment for tic is also still manifest. However, those who believe in the latter's effect conveniently forget the remissive characteristics of the disease, and the frequent difficulty encountered in differentiating true tic and other facial neuralgias. An increasing individual experience corrects these errors sooner or later. The most significant work was that done by Sjöqvist.⁶⁸ Nothing more fundamental or of greater importance along this line has come out since the original work of Frazier and Spiller. Sjöqvist has been able to work out the pathway of the pain fibers as distinct from those carrying other forms of sensation as they pass through the posterior root of the fifth cranial nerve and into the medulla. As a significant piece of practical neurophysiology, this work cannot be overestimated. As a practical aid by way of a new operation for the relief of trigeminal neuralgia, it still leaves much to be desired. Even in Sjöqvist's hands, the results have not been entirely favorable, and the complications have been rather frequent and severe. Rowbotham,⁶⁹ to be sure, reports favorable results in 2 cases, but this number cannot be considered enough to offset the deficiencies found in Sjöqvist's series of 9. Hyndman⁷⁰ adds another uninteresting chapter to the discussion as to whether the temporal or cerebellar route is the better one to use in extramedullary section of the sensory root of the fifth nerve. The article redeems itself, however, because in it is described a new guillotine knife, which has every appearance of becoming a useful addition to the neurosurgical armamentarium. The perennial difficulty of differentiating true trigeminal neuralgia and the other facial neuralgias is further complicated by the description of a new syndrome of vascular headache and its treatment by histamine. Horton, MacLean and Craig⁷¹ report on 84 pa-

tients who, in the fourth or fifth decade of life, had causeless headaches not of the migraine type. The headaches were accompanied by a constant, excruciating, burning, boring type of pain which was limited to one side of the head and involved the eye, the temple, the neck and often the face. There were no trigger zones. There was frequently marked tenderness on pressure over the branches of the external and common carotid arteries. The attack appeared and disappeared suddenly, and remissions and exacerbations occurred. A vasodilatation on the same side of the head as the pain was invariably coincident with the onset of the pain. Sixty-five patients obtained definite and permanent relief for from two weeks to eighteen months following the subcutaneous injection of 0.05 mg of histamine twice daily for two days. This dose was increased on the third and fourth days to 0.066 mg twice and on the fifth day to 0.1 mg twice. This last dose was continued twice a day for two or three weeks. Surgical intervention is not warranted.

DIAGNOSIS

So many neurosurgical diagnostic procedures used today depend on the introduction into the body of radio-active or radio-visible substances that a knowledge of their dangers and limitations is essential to the surgeon. The use of Thorotrast, while not so indiscriminate as in the past, is still a recognized neurosurgical diagnostic procedure. Jacobson and Rosenbaum⁷² report the postmortem findings and the results of their study of the radio-activity of the tissues taken from a patient who died five years after the use of Thorotrast. In the light of their investigation it cannot be seriously contended that even the diagnostic use of the radio-active substance is harmless. Carrillo,⁷³ in a book on iodoventriculography as applied to posterior fossa tumors, takes what must be considered an extreme view of the necessity for the diagnostic use of radio-active and radio-visible substances. Even though the work is based on 550 cases, I can see no justification for his enthusiasm. Modern tumor neurosurgery recognizes that the type of surgery applicable to the individual neoplasm depends as much on the determination of its cellular make-up as it does on its location. Operative exploration is indispensable in order to determine the former, and will necessarily accomplish the latter without the introduction into the ventricular system of unreclaimable foreign substances. The same criticism applies to the work done by Fischer⁷⁴ in his attempts to make a pre-operative histological classification of cerebral tumors by angiography. It cannot be emphasized too strongly that this process is dangerous, and is justifiable only in very exceptional cases.

With the widespread popularity of the extruded nucleus pulposus as a possible cause of any type of pain in the back and legs, the intrathecal injection of Lipiodol has reached alarming proportions. This is the truer because a knowledge of its late effects on cauda equina, meninges, cord and roots has been conspicuous by its absence. I have had a case in which the aqueduct of Sylvius was blocked after diagnostic intraventricular injection of Lipiodol, and an otherwise normal brain was transformed into one with a slowly advancing hydrocephalus, as the result of the attending doctor's use of his imagination rather than his knowledge. Brown and Carr¹⁶ have contributed a valuable paper on this subject. They review the literature and report one completely worked up case. They conclude that "the use of any substance which may produce such changes cannot be regarded as entirely harmless and its indiscriminate use should not be encouraged."

The recent substitution of 95 to 98 per cent oxygen for air in ventriculograms and encephalograms may possibly be of some use in promoting the comfort of the patient immediately after these procedures. Impartial observers do not agree on this point. All agree, however, that the absorption of oxygen from the ventricles and subarachnoid space is so much faster than that of air that without perfect and immediate roentgenoscopy the final films of a given series of x-ray exposures may be so poor as to be unreadable. Congdon and Burgess¹⁷ fail to emphasize this point in their paper on the use of oxygen in the treatment of abdominal distention and other conditions.

The early recognition of the presence of surgical shock and its differentiation from hemorrhage are of great importance. Moon¹⁸ points out why this is so, mentions the weakness of previous differential diagnostic methods, and offers a simple and an apparently reliable test for such recognition. He reaffirms what many surgeons have stated previously, that arterial blood pressure is not an accurate criterion of the presence of shock. He further states—and others have had the same experience since the publication of his article—"The presence of hemoconcentration is the earliest clinical sign of shock. It is easily detected, is regularly present before other signs appear, and results from the same mechanism which causes shock." He affirms that hemoconcentration may be shown by hematocrit readings, an increase in specific gravity, hemoglobin determinations or erythrocyte counts. His experience indicates that the last is more satisfactory as an index than any of the others. Thus, a rise in the red-cell count

from 5,000,000 to 6,000,000 represents a concentration of 20 per cent. This is ominous, and indicates that the mechanism of shock is already in operation. A concentration of 40 per cent is soon followed by other evidence of circulatory disturbance. The importance of this test cannot be overestimated.

Since alcoholism so frequently complicates craniocerebral injuries, a diagnostic procedure that is reasonably accurate has long been needed. Jetter,¹⁹ although primarily interested in determining the presence of legal intoxication, points out the value of ascertaining the concentration of blood alcohol, and mentions its use in diagnosing coma from an unknown cause.

Myelography, the visualization of the cauda equina through an ingenious development of the cystoscopy principle, has been made possible by Pool.²⁰ He was able to make accurate preoperative diagnoses by this method when other means had failed. Unquestionably the field of usefulness of this instrument will and should spread.

ANESTHESIA

Beecher²¹ introduces a note of sanity in estimating the statistical and other data relative to any given anesthetic. Before accepting at their face value claims made for any one anesthetic as being better than others, the surgeon should bear in mind this author's statement about significant figures for computing relative death rates.

The effects of anoxia, according to McClure, Hartman, Schnedorf and Schelling,²² may usually be demonstrated during anesthesia induced by present-day methods. In view of the increasing popularity of the barbiturates, their statement that the use of these chemicals as narcotics tends to produce anoxia of the histotoxic type must be given due weight. Caution must be observed in their use for other reasons also. This latter applies particularly, in my experience, to the present most popular neurosurgical anesthetic, Pentothal Sodium—sodium ethyl (1 methyl butyl) thiobarbituric acid. Injudicious haste in administration and the use of too large doses induce laryngeal spasm with not only anoxia but also an oxemia. Small amounts of ether by inhalation will stop the spasm but prophylaxis is a better way. The makers advise against the use of this drug in prolonged operations, in patients with significant liver damage and in conjunction with the administration of sulfanilamide. Lundy²³ advocates reduction of the strength of the Pentothal Sodium solution to 25 per cent. He is also concerned with the patient's respiratory activity and on that account considers the drug unsuitable for children and believes it necessary at times to re-

sort to positive-pressure administration of oxygen.

Myerson, Loman, Rinkel and Lesses⁸³ investigated the effects of amphetamine (Benzedrine) on Sodium Amytal narcosis. They found that the former was effective in preventing or counteracting the sleep induced by the latter, and that in addition a rapid and prolonged rise in blood pressure was brought about. The surgical application is obvious.

MISCELLANEOUS

Hyndman and Van Epps⁸⁴ have written an interesting paper on the possibility of differential section of the spinothalamic tract. In connection with this they contend that the dentate ligament actually lies more posteriorly than is popularly supposed, and that the spinothalamic tract extends farther forward than is usually stated. Basing their contention on a presumed laminated arrangement of the fibers in the tract, they argue that, by properly locating the section, pain can be abolished in one region of the body without affecting other parts. The conception is stimulating but needs verification.

Of considerable interest to industrial as well as to neurosurgeons is the paper by Weeks and Alexander⁸⁵ on the distribution of the 60-cycle alternating current in the animal body. They found that the current as they studied it passed through the animal body as through a structureless gel. It always chose the shortest path from contact to contact and was not deflected by anatomical landmarks. If the two contacts were the two hind feet, the current never reached the spinal cord. If the contacts were one hindfoot and one forefoot, the current crossed the spinal cord at such an angle as would demarcate the shortest line from one contact to the other. If the current was passed from forefoot to forefoot, the path crossed the cord with the greatest concentration of current at the seventh cervical segment. In no case did the current actually reach either the medulla or the cerebellum. This would appear to offer an experimental demonstration and explanation of the clinical facts that the respiratory paralysis associated with electric shock is correctable in many cases if therapy is applied early, and that spinal-cord lesions may be frequent and permanent under the same circumstances.

Sodium diphenyl hydantoinate (Dilantin) was introduced by Merritt and Putnam⁸⁶ as an adjunct and a possible substitute for older drugs that have already proved their worth in the medical therapy of convulsive seizures. While its effectiveness in the nonsurgical type of epilepsy has been adequately demonstrated, it does not appear to be as effective in controlling seizures that have what

might be called a surgical background. Too much should not be expected of it, therefore, in such cases.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26101

PRESENTATION OF CASE

First Admission A fifty-five-year-old man was admitted to the hospital complaining of tarry stools.

The patient was well until four months before admission when he noticed a slight amount of bright-red blood in one stool, but saw no more blood in subsequent stools. Three months before entry he went to his doctor because of an "all-in feeling." He complained also of fatigue, weakness, dyspnea on exertion and headache. He was told that his hemoglobin was "30," and was sent home with iron tablets to be taken regularly. Tarry stools appeared while taking the drug and persisted after he stopped treatment. X-ray films were taken, and a duodenal ulcer was diagnosed. He was put to bed for some weeks, was placed on a Sippy diet of milk and cream with Ventrex, and showed a marked improvement. Two months before admission he had gained about 28 pounds and his hemoglobin had risen to "75." He caught a bad cold, however, developed an unproductive cough, and was told by another physician that he had "sinusitis." He began to feel poorly again and rested at home. About three weeks before admission his hemoglobin level was "55," and his stools were tarry black, even without iron. Five days before entry he was seen by a member of the staff of this hospital, and referred here for further treatment. At no time had the patient experienced abdominal pain, nausea, vomiting or fullness after meals. There were no fainting spells, sweating or sudden onset of marked pallor.

The patient smoked ten cigarettes a day, and drank three or four glasses of beer daily in the summertime. He denied the use of hard liquors. He further denied any financial, marital, social or psychic upsets or conflicts during the recent past.

Physical examination revealed a pale, fairly well-developed and nourished man, who lay comfortably in bed. There were no positive findings. The heart, lungs and abdomen were normal, and a neurological examination negative. The blood pressure was 120 systolic, 68 diastolic.

The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 2,890,000 with 55 per cent hemoglobin, and a white-cell count of 6800 with 67 per cent polymorphonuclears. The stained smear showed "considerable" achromia and anisocytosis, with a rare stippled cell and an increase in the number of platelets. The urine was negative. The stool showed a ++++ guaiac test. A van den Bergh test was "too low to read," and a liver-function test was normal. A blood Hinton test was negative.

Roentgenograms of the colon by barium enema revealed multiple diverticula, and a gastrointestinal series showed that the mucosa of the stomach and duodenum were thickened throughout. In the duodenum there was what appeared to be a small ulcer crater on the posterior wall in the superior margin. Films brought to the hospital by the patient showed a much larger crater in this area.

There was no evidence of ulceration, polyp or tumor by proctoscopy. Special blood studies showed that the mean cell volume was 250 per cent, and the plasma prothrombin 72 per cent of normal. The bleeding time was 3½ minutes, and the clotting time prolonged (6 to 10 minutes).

The patient was placed on a regime of 15 cc. of Cerophyll (the preparation contains vitamin A, B₁, B₂, C, K and the grass-juice factor) three times a day and was given a blood transfusion. A re-examination of the gastrointestinal tract by roentgenography, fourteen days after the first gastrointestinal series, revealed no definite evidence of ulcer, there was practically no deformity of the duodenum. The small bowel was completely examined and showed no evidence of disease. The patient improved slightly, but continued to pass tarry stools. On the twenty-first hospital day an exploratory laparotomy under nitrous oxide, oxygen and ether was performed, using a long right paramedian incision. The entire gastrointestinal tract was examined. The stomach was normal. There was a small hiatus hernia admitting two fingers, the neck was not tight. There was no induration about the duodenum that suggested ulcer. There was no Meckel's diverticulum. There were no palpable polyps in the colon, though several non-inflamed sigmoid diverticula were palpated. The appendix was removed in the usual fashion, and the wound closed in layers. Post-operatively the patient seemed improved, though he continued to pass tarry stools. He was discharged thirteen days after operation on his pre-operative regime, to be followed at home. Before discharge, a gastroscopy revealed a diffuse hemorrhagic process throughout the antrum and body of the stomach. The mucosa appeared pale and

smooth throughout, with small rugae, the margins of which were markedly reddened. There were numerous areas of submucosal hemorrhage and blotchy reddening. It was stated by the operator that the preliminary drainage of the stomach yielded an ounce of very reddish-brown bloody secretion, which apparently contained no free hydrochloric acid, the secretion, however, was so bloody that the test with Topfer's reagent could not be accurately read. The pylorus was not seen due to angulation.

Second Admission (four weeks later) He continued to pass dark stools, but felt fairly well with Cerophyll, a high vitamin, high-caloric diet, parenteral liver injections and rest. One week before admission he ran out of Cerophyll and failed to replenish it. One day before entry the patient suddenly felt weak and nauseated, though without pain, then vomited a large amount of red blood. He was given several transfusions in an outside hospital then referred back to this hospital for further treatment. His physical examination showed a pale, anemic, obviously ill man who was breathing rapidly. The blood pressure was 105 systolic, 80 diastolic, the pulse 94, and the temperature 99.6°F. The hemoglobin was 30 per cent, and the red-cell count 1,660,000. He was transfused, and a jejunostomy performed for feeding purposes. He developed an acute parotitis, which cleared in several days. On the fifteenth hospital day another operation was performed.

DIFFERENTIAL DIAGNOSIS

Dr. MYLES P. BAKER This patient entered the hospital with a story of duodenal ulcer demonstrated by x-ray examination three months before, apparently treated in conservative fashion, with the result that there was a weight gain and a rise in hemoglobin. We do not know how long he was on a Sippy diet or how much in the way of avitaminosis he may have developed. During these three months the bleeding recurred though there was none of the discomfort we associate with peptic ulcer.

The important findings on admission were anemia without thrombocytopenia or purpuric manifestations elsewhere in the skin or mucous membranes, absence of leukocytosis, which is commonly seen in gastrointestinal tract hemorrhage, absence of splenomegaly and leukopenia as with Bantu's disease, absence of elevated blood bilirubin, bromsulfalein retention or esophageal varices, indicating that primary intrahepatic disease was most unlikely as a contributory cause of the melena, evidence by x-ray of a duodenal ulcer in the same

position as that of three months before, but smaller. Perhaps Dr. Hampton will show those films now.

Dr. AUBREY O. HAMPTON Apparently the radiologist was searching very hard for the source of bleeding because the ulcer crater is not very plain. I assume that he called this small lesion at the beginning of the second portion of the duodenum an ulcer, and I think the surgeon would have had some difficulty in finding it even if it were there.

Dr. BAKER The x-ray report spoke of thickened mucous membranes.

Dr. HAMPTON Yes, of the mucosa of the stomach and duodenum. The duodenal mucosa is thick and irregular. That is the reason I have some hesitation in calling the lesion an ulcer crater. Barium could get in between the folds and project beyond the lumen as that appears to do and suggest an ulcer crater which is really not present. The mucosa of the duodenum is certainly abnormal.

Dr. BAKER The x-ray films show no sign of any fixed diaphragmatic hernia, of a gastric polyp or of a tumor mass of the stomach, such as lymphoma, primary carcinoma or even invading carcinoma from the body or the tail of the pancreas, all of which sometimes cause tarry stools.

We have a moderate plasma hypoprothrombinemia of a degree, 20 to 30 per cent below normal, such as has been shown in postoperative cases. It is dependent here, I imagine, primarily on blood loss, possibly to some extent on the development of anoxemia or of a deficiency disease. We have no evidence of a liver disease that might have prevented prothrombin formation, nor is there any known factor to prevent vitamin K absorption in the small intestine—no diarrhea, no hypermotility. There may have been deficiency in vitamin K intake. I think hypoprothrombinemia has been noted in cases here in Dr. John D. Stewart's laboratory in individuals with duodenal ulcer or ulcerative colitis. Throughout postoperative convalescence, bleeding continued.

Gastroscopy revealed submucous hemorrhages, anemia, and small, reddened rugae. This picture seems at variance with the x-ray findings. I can not interpret it because I do not know enough about gastroscopic pictures. Is it a picture of a superficial gastritis? In such a condition I believe massive hemorrhage is rare. Nor does it seem to be representative of what I find described as hypertrophic gastritis of long standing in which massive hemorrhage has been shown to occur.

Dr. EDWARD B. BENEDICT I should call it an acute gastritis with erosion and hemorrhage.

Dr. BAKER There is no evidence of long stand-

ing hypertrophic gastritis in which erosions represent an exacerbation?

DR BENEDICT After all, you can have erosions in superficial, atrophic as well as in hypertrophic gastritis

DR BAKER Four weeks later, after having been on vitamin K for a week, massive hemorrhage occurred. I am in doubt as to the importance of vitamin deficiency. If it is a primary cause of hemorrhage with overlying superficial erosion in the gastric mucous membranes, superficial ulcer formation and demonstrable submucous hemorrhage by gastroscopy, it is a new disease picture to me. Moreover, the plasma prothrombin should be as low as 40 per cent of normal or less before there is much danger of bleeding. As I understand it, vitamin K given to individuals with a level of 70 per cent is merely a preventive measure. Some do not bleed with a prothrombin level as low as 30 per cent.

I therefore lean to a diagnosis of primary ulcerative gastritis of undetermined type, hypertrophic or otherwise, non-malignant in nature, with a secondary vitamin K deficiency, making for a vicious circle of continuous bleeding. For this, I take it, a subtotal gastrectomy was attempted, with jejunostomy to permit of giving a vitamin K and cholic acid mixture and nourishment without interruption.

DR BENEDICT We have here an interesting case where x-ray examination and surgical exploration failed to show anything wrong with the stomach. On looking inside the stomach I found obvious cause of the bleeding, and it was an acute process which was bleeding at the time I looked in. The longer I do these gastroscopic examinations the more I am impressed with the rapidity with which erosions and small ulcers may heal. They will clear up rapidly and fail to show a few days after hemorrhage. I thought we were dealing with an acute hemorrhagic process from gastritis.

DR ARTHUR W ALLEN This patient was x-rayed in his community hospital by Dr. Robert G. Vance, who thought that there was a definite, posterior-wall duodenal ulcer. These films came down to this hospital with the patient, and Dr. Hampton agreed that there was an ulcer. He confirmed the opinion on further examination here, although he stated that the ulcer was not large. In other words we believed that we were dealing with a typical penetrating duodenal ulcer producing a massive hemorrhage. The man was in the borderline age group,—fifty,—but still his arteries were not sclerotic and we thought that he probably would stop bleeding.

The first operation was done after he had recovered from his hemorrhage. His red-cell count

and hemoglobin were within normal limits that time, and we went in expecting to do a subtotal gastrectomy for ulcer in the duodenum. I have never seen an ulcer in the duodenum that had produced hemorrhage that did not leave a scar that could be seen or felt, even though healing had taken place. In this instance I could find anything abnormal in the duodenum. The stomach was perfectly soft and pliable in every part, and the pylorus was patent. The stomach was normal to palpation and inspection. I then believed that we were probably dealing with hemorrhagic gastritis rather than with ulcer, and did not feel justified in subjecting him to gastrectomy. We had the gastroscopy done after operation, not before, and Dr. Benedict confirmed the suspicion that gastritis was present. The patient continued to bleed in spite of as good treatment as we knew how to give him. Dr. Stuart did the prothrombin level and found it somewhat low, so that is why he was given vitamin K preparation. We did not worry about letting him go home. We thought he would be perfectly all right, and would get over the gastritis on a prepared dietary regimen.

We were greatly surprised when his physician called us up and said that the patient had had another massive hemorrhage and that he was afraid he could not get him to the hospital. I transfused him and sent him in by ambulance. The next day we did a jejunostomy in order to nourish him because we realized that unless he continued to get food and vitamins into him he could not possibly recover. He did well again and his red-cell count reached 3,000,000 and hemoglobin 70 per cent in about two weeks. Then suddenly at five o'clock one morning he felt weak and nauseated, and when we came in to see him a little later, he had obviously had another massive hemorrhage, so without any further ado we took him immediately to the operating room and did a subtotal gastric resection for what we supposed was an uncontrollable hypertrophic gastritis. Much to our surprise the specimen showed a very small ulcer on the lesser curvature of the stomach, no more than 3 mm in diameter, so that Dr. Benedict probably could not see it. I am sure that Dr. Hampton never could have seen it by x-ray. It probably was there at the time of the first exploration, but was so small it could not be felt. I did not know it was there until I looked at the specimen after resection, but it led directly into a large branch of the gastric artery, and it was from that source that the massive hemorrhage had come.

PREOPERATIVE DIAGNOSIS

Hypertrophic gastritis

DR. BAKER'S DIAGNOSIS

Chronic hypertrophic gastritis, with superficial ulcerations

ANATOMICAL DIAGNOSES

Gastric ulcer
Chronic gastritis

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY Dr. Allen has explained that this ulcer was a very small one, slightly less than a centimeter in diameter, and it was also a very shallow one. It penetrated the muscularis mucosae into the submucosa, but there was no thickening, scarring or even inflammatory infiltration of the muscularis. That explains why it was impossible to discover it by palpation. There was nothing on the surface of the stomach that would have given any indication of its presence.

It would be interesting if I could say definitely how old the ulcer was, but I do not believe I can. It showed a little fibrosis in its base, so that it was obviously not an entirely acute ulcer. On the other hand, the scarring was all in such superficial layers of the wall that I hardly believe it could have been very chronic. That it had been present two months seems doubtful. We found no scar to suggest that another ulcer had been present and had healed.

DR. ALLEN We included a little segment of duodenum in the resected specimen. There was certainly no ulcer in that.

DR. MALLORY No, we found nothing in it.

DR. MAURICE FREMONT-SMITH Was there a gastritis?

DR. MALLORY Yes, but there can be no question that the ulcer was the source of the hemorrhage because it eroded into an artery, as Dr. Allen has pointed out, as well as into numerous rather large submucosal veins.

DR. F. DENNETTE ADAMS How many proved cases of massive hemorrhage due to gastritis are there?

DR. MALLORY We have had perhaps a half dozen in the hospital in which we believed that we had proved it, at least we found nothing else.

DR. ALLEN I looked up all of them here. I cannot remember the figures, but they have been published.¹ It is definitely one of the less common causes for fatal hemorrhage, but there have been a number of fatal hemorrhages from that cause and nothing else so far as could be shown.

DR. ADAMS Proved at autopsy?

DR. ALLEN Yes

DR. BENEDICT In 1937 I² reported 20 cases, in a two-year period, of mild to severe hemorrhage from gastritis alone.

DR. ADAMS How do you know it was that alone?

DR. BENEDICT From the gastroscopic picture, negative x ray findings and exploration.

DR. WYMAN RICHARDSON Do you classify this case as one of gastritis or peptic ulcer?

DR. MALLORY Primarily, I have to call it ulcer.

DR. RICHARDSON Why do you not call it gastritis and ulcer?

DR. MALLORY It was a real ulcer.

DR. RICHARDSON It was a real gastritis.

DR. MALLORY All cases of ulcer have gastritis along with the ulcer. I have never seen an ulcer not associated with gastritis.

DR. ALLEN This is the only one that penetrated the large vessels that I have seen associated with clinical gastritis. I think that is the difference. I agree that this is a true ulcer.

DR. BAKER Is it not unusual to have this picture by x ray and find other than gastritis? Must there not have been a diffuse gastritis as well as the localized gastric ulcer?

DR. HAMPTON It is possible that there may have been a severe duodenitis as well. That is frequently associated with ulcer. Hemorrhage might be associated with either gastritis or duodenitis.

DR. ALLEN I did not mean to imply that it was an uncontrollable peptic ulcer. There was plenty of gastritis, as there usually is with peptic ulcer.

DR. RICHARDSON It is rare to have ulceration without hydrochloric acid.

DR. MALLORY That was not very adequately tested here.

DR. HAMPTON How often do you think you can find healed gastric ulcer by palpation?

DR. ALLEN I suppose it would depend entirely on how much inflammation there had been and how much scar tissue had formed in the process of healing. I think one can be a little more certain in the duodenum than in the stomach, because the former is a thin walled structure and you can see a small scar or pucker quite well, but in the stomach you may very well overlook one.

DR. BENEDICT Gastroscopically they heal so quickly that you can very often see no trace.

DR. ALLEN I think we should add that he is well and back at work and has not bled since operation.

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CASE 26102

PRESENTATION OF CASE

First Admission A forty-five-year-old Russian carpenter was admitted complaining of pain in the chest

The patient had been well until five weeks before entry, when he developed a severe head cold after exposure to cold frosty weather. The symptoms consisted of mucoid nasal discharge, conjunctivitis, puffy face and a slight nonproductive cough. There were slight anorexia and occasional night sweats. The patient continued with his work and a week after the onset began to have moderate burning pain in the lower posterior portion of the left chest, radiating into the left axilla at the level of the nipple. The pains occurred approximately four or five times daily and lasted about fifteen minutes. The discomfort did not interfere with his activity but occasionally woke him at night when he turned over on his right side. Lying on the left side usually relieved the pain but deep inspiration aggravated it. The cough continued, there was slight dyspnea with exertion, and although the pain recurred up to the day of entry, there was no increase in severity or frequency. Three weeks before coming to the hospital the patient first noted dull gnawing epigastric pain, which recurred about once every three days shortly after meals and lasted for about two hours. It was usually relieved by soda, food or gaseous eructations. There was no nausea or vomiting, but the patient lost 37 pounds during the six weeks preceding entry.

Physical examination showed a well-developed, fairly well-nourished man in no acute discomfort. The heart was not enlarged, and there were no murmurs. The blood pressure was 120 systolic, 80 diastolic. Examination of the lungs showed dullness at the right apex anteriorly and posteriorly. In this region there was questionable bronchial breathing with increased tactile fremitus and vocal resonance. In the lower portion of the left axilla there was impaired resonance with diminished breath sounds and tactile fremitus. No rales were heard. There was slight tenderness and voluntary spasm in the right upper abdomen, but no masses were felt.

The temperature was 100.0°F, the pulse 88, and the respirations 22.

Examination of the urine was negative. The blood showed a red-cell count of 4,300,000 with 80 per cent hemoglobin. The white-cell count was 51,250 with 85 per cent polymorphonuclears, 11 per cent lymphocytes, 2 per cent monocytes, 1 per cent eosinophils and 1 per cent basophils. A stool examination was negative. A blood Hinton test

was negative. The nonprotein nitrogen of the blood serum was 22 mg per 100 cc, and the serum protein 5.6 gm. Sputum was scanty and mucoid, and contained no acid-fast bacilli.

X-ray examination of the chest showed a triangular area of homogeneous density in the central portion of the right upper lobe, the density pointing toward the extreme apex of the axilla. The remainder of the lung field was clear, and the heart and mediastinum were negative. Examination of the esophagus, stomach and duodenum showed no evident abnormality.

The patient's condition remained unchanged. His temperature fluctuated between 98.0 and 100.0°F, and the white-cell count rose to 58,000. He was discharged against advice on the eighth hospital day.

Final Admission (eighteen days later) Following discharge the patient felt quite well for about four days. He then developed marked anorexia and frequent emesis of ingested material, and the pain in the left side of the chest recurred. About a week before returning to the hospital, while turning over in bed, he experienced a severe pain in the left axillary region and immediately coughed up a large amount of foul, yellowish, blood streaked material. The odor caused him to vomit at the same time. Subsequently the emesis ceased, but he continued to raise about a cupful of foul sputum daily. The pain in the left chest became constant and increased in severity. Inspiratory movements and cough aggravated the discomfort.

Physical examination showed the patient to be flushed and evidently ill. The signs in the left lower axilla had disappeared, but those at the right apex were unchanged. The edges of the liver and the spleen were both felt directly beneath the costal margin, but the remainder of the examination was essentially as it had been on the previous entry.

The temperature was 99.6°F, the pulse 90, and the respirations 20.

Examination of the blood showed a red-cell count of 5,070,000, with a hemoglobin of 90 per cent. The white-cell count was 116,000, with 93 per cent polymorphonuclears, 2 per cent eosinophils, 1 per cent lymphocytes and 4 per cent monocytes. No immature cells were found, although many band-form neutrophils were noted. The majority of the polymorphonuclears contained toxic granules and many were vacuolated. Examinations of the stools were negative. The blood chlorides were equivalent to 81 cc of N/10 sodium chloride. The nonprotein nitrogen of the blood serum was 46 mg per 100 cc, and the uric acid 9.6 mg.

A lateral x-ray film of the chest showed a well-

circumscribed, slightly lobulated, ovoid area of consolidation within the central portion of the right lung field. No comparison with the previous films was recorded.

The patient's general condition remained unchanged. His temperature fluctuated irregularly up to 103.0°F. Blood cultures were negative. On the third day the patient developed severe pain in the left lower chest, which required morphine for relief. Inspiratory movements increased the discomfort, and diaphragmatic excursion was limited on this side. The cough continued, and the sputum remained quite foul. The white-cell count rose to 135,000, but there was no significant change in the differential formula. He became progressively weaker and died on the twenty-ninth hospital day, fifty-five days after his initial entry.

DIFFERENTIAL DIAGNOSIS

DR. BERNARD M. JACOBSON The history reveals a previously well patient who developed, with an acute onset five weeks before entry, symptoms of infection of both the upper and the lower respiratory tract, which persisted without letup. The presence of anorexia and night sweats is very suggestive of an infectious process. The cause of epigastric pain, recurring about once every three days, is obscure. The loss of 37 pounds during six weeks is impressive, and raises the question of whether we are faced with disease other than acute or subacute infection.

The physical findings at the first entry were those of consolidation in the right upper lobe, and possibly either a small amount of fluid in the left chest or partial atelectasis of the left lower lobe. The striking laboratory finding is the leukocytosis of 51,000, mainly of neutrophils, with no immature forms involved. This fact suggests very strongly an infectious process. X-ray study of the chest confirmed the physical findings in the right upper lobe.

At this point we may pause to speculate. The physical, x-ray and laboratory findings are not pathognomonic of any one disease, but are suggestive of one of a few, namely pneumonia, pulmonary infarct, lung abscess and, finally, neoplasm. Against pneumonia and infarct is the six weeks' duration of the symptoms. By the time of entry, a pneumonia would certainly have been resolved, nor do the symptoms prior to entry suggest pneumonia. An infarct involving almost the entire right upper lobe is very unlikely in the absence of pain in the right chest and of hemoptysis. Lung abscess is not suggested by either a preceding operation in the mouth or throat, by previous unresolved pneumonia or by an infec-

tious process elsewhere in the body. The marked leukocytosis, of course, is compatible with pulmonary suppuration. Finally, could this be a primary bronchiogenic carcinoma? The duration of symptoms is not too short, the loss of 37 pounds is highly suggestive. The leukocytosis is not consistent with neoplasm alone. On the other hand, secondary abscess formation in a neoplasm would be compatible with all the findings. Metastatic nodules in the pleura on the left side might well have caused the burning complained of in the left axilla.

To return to the final admission—the course of the patient was rapidly downhill. The sudden appearance of very foul sputum is suggestive of abscess that ruptured into the right upper bronchus. The only new physical signs are the palpable liver and spleen. The strikingly high leukocytosis, again without immature forms, is rare in infectious diseases, but has been observed. The absence of myelocytes almost certainly rules out leukemia. The fairly low serum chloride is probably due to infection, poor salt intake, loss of salt through emesis, and increased loss of salt through the skin. The elevated serum nonprotein nitrogen in the absence of anything to suggest nephritis is undoubtedly due to impaired renal function dependent on the moderately low blood-chloride level, and the elevated serum uric acid content is adequately explained both by the impaired renal function and by the infectious process.

The terminal course of the patient was marked by increasing evidence of suppuration and of diminishing pulmonary function. The cause of the sudden severe pain in the left lower chest is not clear, for no physical or x-ray findings are recorded at this time. Either pleural metastatic involvement or pneumothorax from rupture of a metastatic lesion into the pleural cavities is a possibility.

My diagnosis is the combination of bronchiogenic carcinoma of the right upper lobe and secondary abscess.

CLINICAL DIAGNOSES

Myeloid leukemia.
Lung abscess.

DR. JACOBSON'S DIAGNOSIS

Bronchiogenic carcinoma of the right upper lobe, with secondary abscess.

ANATOMICAL DIAGNOSES

Carcinoma of lung (right upper lobe bronchus), with metastases to the regional and retroperitoneal lymph nodes, liver, pancreas, adrenal glands and right kidney.
Leukemoid hyperplasia of bone marrow.

Thrombosis of splenic and portal veins
 Splenic infarction, multiple
 Bronchopneumonia, slight, left
 Pulmonary tuberculosis, healed, apical, right
 Pulmonary emphysema, bilateral, apical
 Arteriosclerosis, slight, aortic and coronary
 Operative wounds sternal biopsy

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY Dr Jacobson has made a very much easier job of this differential diagnosis than did the clinicians who had charge of the patient on the ward or the numerous consultants who were asked to express their opinions. I cannot help wondering if two years ago when this patient was in the hospital Dr Jacobson would have tossed off so easily a white count of 135,000. To many who saw the patient at that time the count was regarded as *prima facie* evidence of leukemia, and the palpable liver and spleen seemed to fit the picture. Some consultants wished to interpret the lung findings also as evidence of leukemic infiltration. The laboratory was asked for aid, and shortly before his death a bone-marrow biopsy was performed. We were as much troubled by it as the clinicians had been by the peripheral blood picture. There was an extraordinary hyperplasia of the white-cell series, with complete displacement of all the fat from the marrow, and although red-cell formation was not interfered with, it seemed buried under the enormous number of cells of the myeloid series. In comparison with an ordinary leukemia, however, it was very striking that in the marrow, just as in the peripheral blood, there was no interference with differentiation and the preponderant cell was a fully mature polymorphonuclear. Opinions in the laboratory staff were divided for and against leukemia, but eventually a diagnosis of probable myelogenous leukemia was recorded. Review of the case two years later makes it quite certain, I believe, that we were in error.

The autopsy showed, as Dr Jacobson predicted, a large bronchiogenic carcinoma occupying most of the right upper lobe and evidently arising from the main bronchus to this lobe. There was no abscess, however. Strangely enough the tracheo-bronchial and peribronchial lymph nodes were not involved, but in the anterior mediastinum was a mass of nodes 5 by 4 by 3 cm. There were massive intra-abdominal metastases lying chiefly in the retroperitoneal tissues and completely replacing the right adrenal gland and the body and tail of the pancreas. The latter tumor had invaded the splenic vein and solidly plugged it with a tumor thrombus. This accounted for the great enlargement of the spleen, which weighed 550 gm., though there were a few peritoneal metastases on its surface. A few partially organized fibrinous thrombi were found in the portal vein but did not occlude it. Numerous sections of bone marrow showed a picture identical with that seen in the biopsy specimen. Everywhere there was massive hyperplasia of the white-cell series, without any failure of differentiation. Nowhere in the body was there a trace of leukemic infiltration, the liver, spleen and lymph nodes being all negative in this regard.

In the intervening two years numerous cases have been recorded demonstrating so-called leukemoid states which closely simulate and may easily be mistaken for leukemia. Jackson's¹ recent paper presents the subject with great clarity. It is evident that chronic sepsis, miliary tuberculosis and certain cases of carcinoma may produce such reactions. In addition there are other cases in which no hint of an etiologic factor can be elicited for which the name "agogenous myeloid metaplasia" has been coined.

REFERENCES

- 1 Jackson H. Jr: Protean character of the leukemias and the leukemoid state. *New Eng J Med* 220:175-181 1939
- 2 Jackson H. Jr and Parker, F. Jr: Agogenous myeloid metaplasia. *New Eng J Med* (in press)

The New England Journal of Medicine

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THE NEW HAMPSHIRE MEDICAL SOCIETY
THE VERMONT STATE MEDICAL SOCIETY

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THE PRACTICE OF MEDICINE BY UNREGISTERED PERSONS

THE Report of the Committee Appointed to Study the Practice of Medicine by Unregistered Persons should be read and re-read carefully by every physician. It was suggested, perhaps too ambitiously, that the committee study the functioning of the Board of Registration in Medicine and, so far as possible, devise means whereby the Board could and would prevent the practice of medicine by unregistered physicians. The report is wisely restricted to the study of the situation, since its correction is outside the committee's province, although it may properly make recommendations.

The situation revealed by the investigation — and the committee has apparently recorded faithfully what it has found — is truly deplorable. There is

found a lack of the funds necessary for the Board of Registration in Medicine to function properly. However, whether the Board does its work well or not, it is in a crucial position with reference to the health of the people and it is a penny wise pound foolish policy to cramp such a board. It is the part of statesmanship to support adequately this important branch of the government, the great value of which is not generally recognized.

The report of the Board, from which quotation is made, indicates that for the year ending November 30, 1938, the expenses were \$8,419.83. It is well known that under the present system of book-keeping of the Commonwealth this does not include salaries of clerks, which item is probably less than an additional \$2500. This gives a total expense of about \$11,000. The receipts for the same year were \$14,353.

These figures do not strike one as remarkable until one notes also that the population of Massachusetts is 4,350,910 and that the number of physicians in practice is estimated at 8000. It does not seem reasonable that in a community of over 4,000,000 persons with 8000 physicians the sum of only \$11,000 is required by the Board of Registration in Medicine to carry out its work properly. The Board cannot adequately do the work that ought to be done, and this is brought out in part by the report, which shows a judicial spirit in spite of making adverse criticism.

Except for eliminating some of the difficulties of the Board, the suggestions offered do not adequately meet the situation. The committee suggests merely the use of "the present dormant law." The real difficulty lies deeper, and for the work set forth by the committee as necessary, even the full income of \$14,353 would not suffice. One part-time investigator would not be enough and more income is needed. The lack of useful files in the office of the Board is noted in the report, but the mere duplication of the alphabetical index in providing a geographical index would be an item of considerable expense.

There is another fact to be noted in connection with the alleged difficulty of the Board in securing appropriations. Budgets are often made up with the expectation that the estimates will be slashed,

and the slashed appropriation is but rarely approved with the idea of doing a good job. Good administration is too often taken to involve the saving of money, instead of the proper handling of the work to be done. Perhaps, in the controversy over appropriations, if the medical profession manifested its interest in attempting to secure proper financial support for the Board, it would be rendering an important public service. It may be said that, under the statute, the responsibility of the Board in the matter of the practice of medicine by unregistered persons has a very limited scope, namely investigation, which the Board can carry out almost not at all, and the reporting of "the same to the proper prosecuting officers," who do the real investigating.

The committee deserves great credit for directing attention to the situation which it has described and for the admirable restraint of its comment. It might be interesting to hear from the Board of Registration in Medicine. In addition, the recommendation of the committee relative to the registration of all members of the Society with their respective town and city clerks should be closely followed.

HARVEY CUSHING'S SEVENTIETH BIRTHDAY PARTY

ON April 8, 1939, there gathered in New Haven, Connecticut, most of the members of the Harvey Cushing Society, a junior group of neurosurgeons, and many friends of Dr. Harvey Cushing to celebrate his seventieth birthday. To record the events of this party a small volume, *Harvey Cushing's Seventieth Birthday Party* (Springfield, Illinois: Charles C. Thomas, 1939), has been issued, which contains speeches given at the dinner and various letters and tributes. Of particular interest are the remarks made by Dr. W. W. Francis, of the Osler Library in Montreal, reviewing his early association with both Osler and Cushing in Baltimore, and the touching comments of Dr. Cushing himself. There are many tributes from friends all over the world and, from old patients, letters sent to Dr. Cushing in grateful recognition of what

he had done to ameliorate their symptoms. Notes of appreciation that have appeared in various medical journals are also appended, as well as "Notes on the Formative Period of a Neurological Surgeon," giving excerpts from his case records at the Massachusetts General Hospital and an estimation of his life as a house-pupil. The book is beautifully printed and contains some fine illustrations including one of the members of the Harvey Cushing Society, one of the dinner gatherings, and plates taken from the case records of the Massachusetts General Hospital. There is also a reproduction of a crayon portrait of Dr. Cushing, done by Mr. Deane Keller, of New Haven, in 1939.

This volume will be welcomed by a large group of friends and associates of the late Dr. Cushing, as well as by many patients whose lives were saved by his efforts. The edition is limited, there being only 150 copies on special rag paper and a somewhat larger number on ordinary paper. The volume is a companion book to *A Bibliography of the Writings of Harvey Cushing* (Springfield, Illinois: Charles C. Thomas, 1939). The latter was prepared on the occasion of Dr. Cushing's seventieth birthday by the Harvey Cushing Society and is already out of print, and one has little doubt but that the present volume will enjoy the same popularity. This in itself will form a fitting tribute to one of America's greatest physicians.

MEDICAL EPONYM

BELL'S PALSY

Bell's palsy and the respiratory nerve of Bell were described by Charles Bell (1774-1842) in a communication read July 12, 1821, by Sir Humphry Davy before the Royal Society of London, entitled "On the Nerves. Giving an account of some experiments on their structure and functions, which lead to a new arrangement of the system." This appears in the *Philosophical Transactions of the Royal Society of London* for that year.

After describing the "respiratory nerve of the face, being that which is called the *portio dura* of the seventh" and detailing his experiments, he says:

We have proofs equal to experiments, that in the human face the actions of the muscles which produce smiling and laughing are a consequence of the influence of this respiratory nerve.

Cases of this partial paralysis must be familiar to

every medical observer. It is very frequent for young people to have what is vulgarly called a blight by which is meant, a slight palsy of the muscles on one side of the face, and which the physician knows is not formidable. Inflammations of glands seated behind the angle of the jaw will sometimes produce this. All such affections of the respiratory nerve will now be more easily detected the patient has a command over the muscles of the face, he can close the lips and the features are duly balanced but the slightest smile is immediately attended with distortion and in laughing and crying the paralysis becomes quite distinct.

The knowledge of the sources of expression teaches us to be more minute observers.

R W B

MASSACHUSETTS MEDICAL SOCIETY

CHANGES IN MEMBERSHIP

Through an oversight, the Committee on Membership failed to include the names of certain fellows for changes in membership in its report to the Council on February 7.

In order to prevent delay the President has authorized me to submit herewith a supplementary list, with recommendations of changes which will be made effective as of February 7. This list will be presented to the Council for confirmation at the meeting on May 21 and will be included in the official minutes of that meeting.

ALEXANDER S BEGG, M.D., *Secretary*

* * *

SUPPLEMENTARY REPORT OF COMMITTEE ON MEMBERSHIP

The committee recommends.

1. That the following named fifteen fellows be allowed to retire as of December 31 1939 under the provisions of Chapter I, Section 5 of the by-laws

Cause, Georges E., Lowell, with remission of dues for 1938 and 1939
Hannan, David E., York Village, Maine
Hart, Joseph S., Burlingame, California
Hopkins, William T., Lynn
Howe, W. Lewis, Everett
Loughton Florence M., New York City
Learoyd Charles B., Danvers
McCarthy Thomas H., Brockton with remission of dues for 1937, 1938 and 1939
Newhall, Avery L., West Lynn
Outhouse, John S., Shelburne Falls
Pierce, Appleton H., Coatesville, Pennsylvania
Reddy Joseph W., South Boston
Richardson, Oscar, Lakeville
Stone, Frank E., Lynn
Young, Anna R., Waltham

2. That the following named seven fellows be allowed to resign as of December 31 1939 under the provisions of Chapter I Section 7 of the by-laws

Crosbie, Arthur H., Boston
Donley Dorothy E., Columbus, Ohio

Hoffman, Doris, Wolcottville, Indiana
Leith Richard B., St. Petersburg Florida
Nance William K., Wolcottville, Indiana
Philbrick, Maurice S., Skowhegan Maine, with remission of dues for 1939
Whittemore, Wyman Boston

3. That the dues of the following named six fellows be remitted under the provisions of Chapter I Section 6 of the by-laws

Bailey Florence, Lawrence, 1938 and 1939
Coynce, John A. Brookline, 1937 1938 and 1939
Danforth, Mary, China 1937, 1938 and 1939
Kramer Florence R., Lynn 1937 1938 and 1939
Ruston Warren D., Rockport, 1937, 1938 and 1939
Young Ralph R. Jamaica Plain, 1937, 1938 and 1939

4. That the following named two fellows be deprived of the privileges of fellowship under the provisions of Chapter I, Section 8 Clause b of the by-laws

Feigenbaum, Jacob Montreal
Freeman, Norman E. Philadelphia Pennsylvania

5. That the following named fellow be allowed to change his membership from one district society to another without change of legal residence, under the provisions of Chapter III Section 3 of the by-laws

From Middlesex South to Norfolk
Applebaum Jacob Newton

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

FATAL INTRAPARTUM UTERINE SEPSIS

Mrs. C., a forty-seven year-old para VII, at term, entered the hospital on February 18, 1936, with ruptured membranes, she was not in labor.

The family history was essentially negative, but the patient's husband was tuberculous. The patient gave a history of scarlet fever and an appendectomy. She had had six full-term pregnancies, the last seven years previously. The first and fifth had been terminated instrumentally. The puerperiums had been uneventful. Catamenia began at fourteen, were regular and normal in duration. The last period was May 5 1935, making the estimated date of confinement February 12. The present pregnancy had been uneventful except for false labor at eight months, for which she had been admitted to the hospital and kept under observation for five days.

Examination on entry showed a well-developed and nourished woman. The temperature was 99.0°F., the pulse 94, and the respirations 24. The heart was not enlarged, the sounds were clear and

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

and the slashed appropriation is but rarely approved with the idea of doing a good job. Good administration is too often taken to involve the saving of money, instead of the proper handling of the work to be done. Perhaps, in the controversy over appropriations, if the medical profession manifested its interest in attempting to secure proper financial support for the Board, it would be rendering an important public service. It may be said that, under the statute, the responsibility of the Board in the matter of the practice of medicine by unregistered persons has a very limited scope, namely investigation, which the Board can carry out almost not at all, and the reporting of "the same to the proper prosecuting officers," who do the real investigating.

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MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions of the Medical Postgraduate Extension Courses have been arranged for the week beginning March 10

MASSACHUSETTS

Thursday March 14 at 4.30 p.m., at the Bishop House of Mercy Hospital Pittsfield. Pneumonia. Instructor W Barry Wood, Jr Harry G Mellen *Chairman*

MASSACHUSETTS (Fall River Section)

Tuesday March 12, at 4.30 p.m., at the Union Hospital, Fall River. Indications for Cesarean Section. Instructor M. Fletcher Eades. Howard P Sawyer *Chairman*

MASSACHUSETTS

Thursday March 14 at 7.30 p.m. at the Franklin County Hospital Greenfield. "Pediatric Institute. Case histories and related clinical problems. Instructors Warren R. Sisson and Lewis W Hill Halbert G Stetson *Chairman*

MASSACHUSETTS

Thursday March 14 at 4.00 p.m., at the Academy of Medicine, Professional Buildings, 20 Maple Street, Springfield, and 8.15 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital Holyoke. Syphilis in Pregnancy and the Offspring. Instructor William P Boardman. George L. Schadt, *Chairman*

MASSACHUSETTS

Thursday March 14 at 4.15 p.m., in the Nurses Home of the Cooley Dickinson Hospital Northampton. Common Problems of Neurology. Indications for lumbar puncture. Instructor T J C. von Storch. Warren P Cordes, *Chairman*

MIDDLESEX SOUTH

Tuesday March 12, at 4.30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor Burton E. Hamilton. Dudley Merrill, *Chairman*

NORFOLK

Thursday March 14 at 8.30 p.m., at the Norwood Hospital Norwood. Gonorrhea in the Female. Instructor Oscar F Cox, Jr Hugo B. C. Riemer *Chairman*

NORFOLK SOUTH

Monday March 11 at 8.30 p.m. at the Quincy City Hospital, Quincy. Syphilis in Pregnancy and the Offspring. Instructor C. Guy Lane. David L. Belding, *Chairman*

PLYMOUTH

Tuesday March 12, at 4.00 p.m., in the Nurses Home of the Brockton Hospital Brockton. Gonorrhea in the Female. Instructor Alonzo A. Paine. Walter H. Pulsifer *Chairman*

SUFFOLK

Thursday, March 14 at 4.30 p.m., in John Ware Hall Boston Medical Library 8 Fenway Boston. Cardiovascular Disease. Eleven important questions

about heart disease and their answers. Instructor Howard B Sprague. Reginald Fitz, *Chairman*

DEATH

HAYES—ALBERT E. HAYES, M.D., of Edgewood Rhode Island, died recently. He was in his seventy-fourth year.

Dr Hayes received his degree from the Harvard Medical School in 1898. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

CORRESPONDENCE

MEDICAL AND SURGICAL ASSOCIATES

To the Editor. Medical and Surgical Associates in developing means of providing medical care to members of Health Service, Inc. have from the start aimed toward a plan which would assure a good quality of care, adequate remuneration of associated physicians, and as little disruption of existing practice as possible. Their communication in the *Journal* of December 7 stressed this desire and called attention to certain considerations that would occasion some adjustment of individualistic medical practice under the service. Quite naturally, however, some of the subsequent discussion suggests a misunderstanding of the aims.

It should be clear that desirable conservatism in the introduction of any such service and imperative economic stability prescribe careful organization of the subscribing members and limitation of physicians rendering service under the plan to at least those interested in its success. Any service not controlled in these respects might well jeopardize medical standards and the income of physicians throughout the Commonwealth. It could justly be attacked as being the first step toward ill-controlled state medicine.

Medical and Surgical Associates hope to open this plan to as many physicians as is practical and consistent with conservative principles. The medical care offered to the subscribers to Health Service, Inc., is organized on the basis of having an internist or pediatrician, who has become an "associated physician" available to each subscriber or dependent who will care for that subscriber or dependent in the home, office or hospital and also of having specialists of all types available for consultation. As subscribing members and the demand for medical care increase, Medical and Surgical Associates would like to refer members to practitioners or pediatricians who are interested and who reside in areas where there are a sufficient number of subscribers. In order not to disrupt any more than necessary the relation between family practitioner and specialist, the practitioner may call in as a specialist anyone certified by the appropriate National Board who is willing to join Medical and Surgical Associates as an "associated physician" in a consulting capacity.

HUGH CABOT M.D., Secretary
Medical and Surgical Associates.

SECOND CALL FOR THE PHARMACOPOEIAL CONVENTION

To the Editor. In compliance with the provisions of the constitution and by laws of the United States Pharmacopoeial Convention I hereby issue this second call to the several bodies entitled under the constitution to representation therein to appoint three delegates and three alternates to the decennial meeting of the Convention for the

Revision of the *Pharmacopoeia of the United States of America*, which is to meet in Washington, District of Columbia, on May 14, 1940

WALTER A. BASTEDO, M.D., *President*,
United States Pharmacopoeial Convention.

N B In order that the records may be brought up to date and checked, that card files may be prepared and that the other functions of the Committee on Credentials may be performed, it is desirable that the credentials of all delegates appointed to attend this decennial meeting shall be in the hands of the secretary, Mr L. E. Warren, 2 Raymond Street, Chevy Chase, Maryland, not later than March 15, 1940

FINNISH RELIEF FUND

To the Editor The Finnish Relief Fund, Inc., is sponsored by Mr Herbert Hoover. It is approved by the Finnish Minister in Washington, His Excellency Hjalmar Procope. It has the main purpose of accepting for the Finnish people and transmitting to Finland any funds contributed for this great cause by the American people. Contributions, unless specifically intended to be used for war material, will be used for food and clothing for the Finnish civilian population, many of whom are suddenly made homeless by having their houses irreparably demolished by the incendiary bombs from Russian aeroplanes.

Members of the American Medical Association are the only doctors who will be asked to contribute through this fund. It is hoped the profession will respond as generously as possible. It is further hoped that every doctor will make some contribution, and no matter how small it may be, it will be gratefully accepted. We believe the profession should have one hundred per cent of its members become contributors to this most worthy cause.

No money is deducted for expenses from any contribution made through this fund, and every dollar donated arrives in Finland worth one hundred cents. No salaries are paid and no financial remunerations are made to officers on duty with the Finnish Relief Fund. Expert auditors make a daily checkup of the donations acquired and chart the results.

The national chairman of the Medical Division of the professional groups of the Finnish Relief Fund, Inc., is Dr John Frederick Erdmann, of New York. A director (chairman) for the Medical Division has been or will be appointed from each state, who will try to get in touch with every member of the American Medical Association of that state by such method as he deems best.

All checks should be made payable to the Finnish Relief Fund, Inc., and sent to the Medical Division, Finnish Relief Fund, Inc., 420 Lexington Avenue, New York, N. Y.

KERWIN W. KINARD, *Director*,
Medical Division, Finnish Relief Fund, Inc.

420 Lexington Avenue,
New York City

NOTICES

REMOVAL

FRED C. GUNTER, M.D., announces the removal of his office to 1101 Beacon Street, Brookline.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, March 13,

from 2 to 4 p.m. Drs Elliott C. Cutler and Soma Weiss will speak on "Abdominal Pain."

Physicians and students are cordially invited to attend.

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, March 13, at 12 o'clock noon, in the Pathological Amphitheater.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, March 12, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance) at 8:15 p.m. Dr Soma Weiss will preside.

PROGRAM

Presentation of cases

The Chemistry of Vitamin K Professor Louis F. Fieser

The Therapy of Vitamin K Dr Arnold Seligman

Medical students and physicians are cordially invited to attend.

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, March 19, at 12 o'clock noon. Dr Herrman Blumgart will speak on "The Clinical Significance of the Collateral Circulation in Patients with Angina Pectoris."

Physicians are cordially invited to attend.

MASSACHUSETTS ITALIAN MEDICAL SOCIETY

The regular meeting of the Massachusetts Italian Medical Society will be held in the Hotel Kenmore, Boston, on Friday evening, March 15, at 9:15. Tel KEN 2770.

PROGRAM

Business

The Bleeding Complications of Pregnancy Dr Roy J. Heffernan.

General discussion

The medical profession is cordially invited to attend.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at "The Hut," on Friday afternoon, March 15, at 4:00. Dr George C. Shattuck will speak, his subject being "The Causation of Heat Effects with Special Reference to Sunstroke and Heat Exhaustion."

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

There will be a meeting of the Essex South District Medical Society at the Addison Gilbert Hospital, Gloucester, on Wednesday, April 3. A clinic will be held at 5:00 p.m. followed by a dinner at 7:00 p.m. Dr Frederick C. Irving will speak on "The Management of Pre-eclampsia."

MASSACHUSETTS DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

SCHOOL PHYSICIAN, SCHOOL DEPARTMENT NORTHAMPTON

Director of State Civil Service, Ulysses J. Lupien has recently announced that a competitive examination is to be held on April 10 in order to find eligibles for appointment to the position of School Physician, School Department, Northampton. The salary is \$250 a year.

The entrance requirements are as follows: applicants must be registered physicians under the State Board of Registration in Medicine. The last date for filing applications is Saturday April 6 at 12 o'clock noon.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY MARCH 10

SATURDAY MARCH 10

- 4 p. m. Health in Middle Age. Dr. William B. Breed. Free public lecture. Harvard Medical School, amphitheater of Building D.
- 4 p. m. New Drugs for the Treatment of Infectious Diseases. Dr. W. Richard Ormer. Illustrated, public health lecture. Fulkner Hospital Auditorium.

SUNDAY MARCH 11

- 9-10 a. m. Review of Recent Cancer Literature. Dr. W. M. Sheldon. Joseph H. Pratt Diagnostic Hospital.
- 8-11 p. m. Topographic Recordings of Uterine Motility. D. Douglas P. Murphy. Journal Club, Boston Lying-in Hospital.
- 8-11 p. m. Harvard Medical Society. Peter Bent Brigham Hospital (Shattuck Street entrance).

MONDAY MARCH 12

- 9-10 a. m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
- 12 m. Monthly clinicopathological conference. Boston City Hospital.
- 4 p. m. Abdominal Pain. Drs. Elliott C. Cutler and Soma Weiss. Peter Bent Brigham Hospital.

TUESDAY MARCH 13

- 9-10 a. m. The Relation of Cancer of the Stomach to Pernicious Anemia. Dr. Thomas Fujiwara. Joseph H. Pratt Diagnostic Hospital.

WEDNESDAY MARCH 14

- 9-10 a. m. Endocrinology. Dr. Fuller Albright. Joseph H. Pratt Diagnostic Hospital.
- 10-11 p. m. Massachusetts Italian Medical Society. Hotel Waverly.

THURSDAY MARCH 15

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

FRIDAY MARCH 16

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

SATURDAY MARCH 17

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

SUNDAY MARCH 18

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

MONDAY MARCH 19

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

TUESDAY MARCH 20

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

WEDNESDAY MARCH 21

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

THURSDAY MARCH 22

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

FRIDAY MARCH 23

- 9-10 a. m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

- April 3 — Page 422.
- May 8 — Annual meeting. Salem Country Club, Peabody.

FRANKLIN

- March 12 — Franklin County Hospital, Greenfield.
- May 14 — Franklin County Hospital, Greenfield.

HAMPSHIRE

- March 13.
- May 8.
- Meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

- March 20.
- May 15.
- Meetings are held at 12:15 p.m. at the Unicorn Country Club, Stoughton.

MIDDLESEX NORTH

- April 24.
- May 31.
- October 30.

NORFOLK SOUTH

- April 4.
- May 2.
- All meetings, with the exception of one which is usually held at the Quincy City Hospital, are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

- March 21 — Goddard Hospital, Brockton.
- April 18 — State Farm.
- May 16 — Lakeview Sanatorium, Lakeville.

SUFFOLK

- March 27 — Scientific meeting. Symposium on Ulcerative Colitis and Diarrhea. Under the direction of Dr. Chester M. Jones.
- April 24 — Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.
- May 2 — Convener's meeting. Page 244 issue of February 8.

WORCESTER

- March 13 — Worcester Memorial Hospital.
- April 10 — Worcester Hahnemann Hospital.
- May 8 — Worcester Country Club.
- Each meeting begins with dinner at 6:30 p.m. and is followed by a business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

- American College of Surgeons 1940-1941 Year Book*. 1077 pp. Chicago: American College of Surgeons, 1940.
- Illustrations of Bandaging and First-Aid*. Lois Oakes. 248 pp. Baltimore: Williams & Wilkins Co., 1940. \$2.00.
- Sexual Disorders in the Male*. Kenneth Walker and Eric B. Strauss. 248 pp. Baltimore: Williams & Wilkins Co., 1939. \$3.00.
- Illustrations of Surgical Treatment Instruments and appliances*. Eric L. Farquharson. 338 pp. Baltimore: Williams & Wilkins Co., 1939. \$6.50.
- Savill's System of Clinical Medicine. Dealing with the diagnosis, prognosis and treatment of disease for students and practitioners*. Edited by Agnes Savill and E. C. Warner. Eleventh edition. 1141 pp. Baltimore: William Wood & Co., 1939. \$9.00.
- Injuries of the Skull, Brain and Spinal Cord. Neuro-psychiatric surgical and medico-legal aspects*. Edited by Samuel Brock. 632 pp. Baltimore: Williams & Wilkins Co., 1940. \$7.00.
- Combined Textbook of Obstetrics and Gynaecology. For students and medical practitioners*. J. M. Munro Kerr et al. Third edition. 1192 pp. Baltimore: Williams & Wilkins Co., 1939. \$12.00.
- Heil Hunger! Health under Hitler*. Martin Gumpert. 128 pp. New York and Toronto: Longmans, Green & Co. (Alliance Book Corp.), 1940. \$1.75.

Good Health and Bad Medicine A family medical guide Harold Aaron 328 pp New York Robert M. McBride & Co., 1940 \$3 00

Carbohydrate Metabolism Four papers presented in a symposium held at the meeting of the American Physiological Society at Toronto, Canada, April 29, 1939 Reprinted from *Endocrinology* 351 pp Boston Endocrinology, 1940 \$1 00

The Kosher Code of the Orthodox Jew S I Levin and Edward A. Boyden. 243 pp Minneapolis University of Minnesota Press, 1940 \$4 50

BOOK REVIEWS

Infections of the Hand Lionel R. Fifield Second edition by Patrick Clarkson. 167 pp New York Paul B Hoeber, Inc., 1939 \$3 25

The first edition of this manual was written by Lionel R. Fifield, demonstrator of anatomy at the London Hospital, and appeared in 1926 This second edition has been rewritten by Patrick Clarkson, demonstrator of anatomy at Guy's Hospital Medical School A knowledge of the structure of the upper extremity is of prime importance in the treatment of hand infections, and this work prepared by practicing surgeons, both of whom are teachers of anatomy, is a sound and practical guide for practitioners The 57 illustrations (including 8 plates, 2 in color) have been well chosen to supplement the concise text

A diagram showing iniquitous incisions and the accompanying explanation merit thoughtful study Sloughing of tendons results from impairment of their blood supply, but the catastrophe is not inevitable Early decompression is, of course, vital The surgeon, however, may jeopardize the blood supply of tendons by improperly placed incisions, improper drainage material and the incorrect use of drains These points are noted in the book but could be stressed to great advantage The single paragraph on human bites is inadequate

Chapter XII covers the prognosis of infections in various situations In certain types the authors state the outcome which may be expected by the average operator The reviewer believes that, if the practitioner carefully observes all the instructions set forth in the preceding pages, his incidence of satisfactory results in early cases will be much higher This book is a splendid exposition of the subject.

Physiology in Health and Disease Carl J Wiggers Third edition 1144 pp Philadelphia Lea & Febiger, 1939 \$9 50

Modern physiology makes an effort to integrate most of the medical sciences in order to express the dynamics of living processes, whether they be normal or pathological In the strictest sense it is no longer a specialized science shared by an isolated group of investigators but rather belongs to the entire medical world Unconsciously we have all become physiologists in the broadest meaning of this term In the seventeenth century the new physiology based on anatomy was called by Garrison *anatomia animata* In recent years even the most cut and dried aspects of medicine have become a *medicina animata* Our outlook has changed a bit as we look on most medical problems in the light of function Because of the great role played by physiology the importance of our general source book on this subject becomes at once important

The third edition of Professor Wiggers' *Physiology in Health and Disease* deserves unquestioned praise. It is a

beautifully arranged book, and all the facts are crystallized in such a way that they bear direct relation to each other The experimental work presented is well supported by accurate references, and a listing of monographs and reviews follows each chapter About a third of the volume has been rewritten There has been a blending of the new material with the old without increasing the size of the text to bulky proportions This has been accomplished by the rephrasing of statements and by the judicious pruning of less important or obsolete material Over 1400 new references have been added.

In this edition the author has expanded on subjects having current interest, such as acclimatization, action potentials, cerebellar function, chemoreceptors and pressor receptors, chest pain, degeneration reactions in muscles, dynamics of hypertension, electrocardiographic chest leads, endocrines, functions of the aorta, functional renal pathology, heat elimination, humoral versus electrical transmission of impulses, methods of measuring cardiac output, prenatal respiration, pulmonary circulation, retinal mechanisms of vision, sensory cortex of the cerebrum, vitamins and phonocardiograms Aside from this new material the book is, of course, replete with basic data in physiology It is recommended to medical students, physicians and all inquirers in the field of physiology, and should be a *vade mecum* of everyone interested in medicine.

Stedman's Practical Medical Dictionary Thomas L. Stedman and Stanley T Garber Fourteenth revised edition. 1303 pp Baltimore William Wood & Co., 1939 \$7 50

Dr Stedman, the originator of this well known medical dictionary, died on May 27, 1938, at the age of eighty-four Until a few days before his death, he was actively engaged on the fourteenth edition, and the work was completed by his nephew, Dr Garber The present edition contains many new words, especially of recently isolated hormones, vitamins and so forth All changes in the *Pharmacopoeia of the United States*, as recorded in the first supplement of the eleventh edition, have been noted, and a copy of the Hippocratic Oath has been added as a frontispiece.

A Textbook of Microbiology Kenneth L Burdon Second edition of *A Textbook of Bacteriology* 638 pp New York The Macmillan Co., 1939 \$2 75

This is a simple and concise teaching manual written by the author for his own purposes in the instruction of nurses and of premedical students. It is comprehensive, clear and well written and admirably fulfills its purpose. It is not, in the reviewer's opinion, adequate for the needs of medical students for whom more critical discussions of recent work and more specific documentation of the literature is desirable. Yet even medical students will find this book an excellent review manual because of its completeness and clear presentation There are no serious omissions, and the reviewer has found no important errors The book—extraordinarily comprehensive for its size—shows evidence of having been written by a competent bacteriologist and is just what its writer intended it to be—a text which takes the "middle course" and is neither too elementary nor too advanced It will not supplement the larger and more advanced texts but is distinctly preferable for almost any type of beginner to a number of the oversimplified, elementary books on the market

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MASSACHUSETTS MEDICAL SOCIETY

Section of Surgery*

SURGERY OF THE STOMACH AND DUODENUM

MEDICAL ASPECTS

CHESTER M. JONES, M.D.†

BOSTON

I HAVE been asked to open this symposium on the surgery of the stomach and duodenum, and shall confine my remarks to the medical aspects of the surgery of ulcer.

In the first place, it will be worth while to define this disease in order to furnish a basis for discussion. A peptic ulcer represents a condition characterized by chronicity and by a tendency to recurrence. Its cause is unknown, and unfortunately this is a disease for which we have no assured cure. I believe that it is of the utmost importance to recognize that the disease is one not to be cured but to be managed. Of course, there is no doubt that gastric and duodenal ulcers at times are cured, but such cases are relatively few, and there is always a tendency to recurrence regardless of the type of treatment. It is essential to stress this fact to the patient. Unless he realizes that he has a disease which tends to recur, the moment he is symptom free he will assume that he is cured and subsequently, in the absence of proper care, will be very likely to have a recurrence.

The causes of recurrence are easily listed and are definite. The first and most obvious group consists of indiscretions in diet, the use of alcohol, excessive smoking and whatever constitutes irregular habits of eating or living. The second cause is infection, and by this I do not mean focal infection. Such infection undoubtedly plays a part in recurrence, but it is of minor significance and treatment by the removal of foci of infection is not as a rule followed by successful results. Focal

infection should be treated on its own merits. I refer rather to intercurrent infection, such as an acute upper-respiratory infection. Recurrences following such infection are probably due to sensitization of the gastric or duodenal mucous membrane, with a subsequent reactivation of the process, by a common cold or similar intercurrent disease. Third, and to my mind of paramount importance, are those factors that can be listed under stress and strain, nervous tension, prolonged emotional disturbances and the like. There is no doubt that the average patient with ulcer has numerous extended periods of stress and strain, that he over reacts to them and that these episodes are frequently the cause of recurrence. Unless we recognize all these factors, not only medical treatment but surgical treatment as well is sure to prove unsatisfactory.

The trend in the treatment of ulcer during the last twenty years is very interesting. About twenty years ago treatment was largely surgical. Since that time there has been a definite shift toward medical therapy not from the point of view of curing the disease, but from the point of view of the management of a chronic recurrent condition. More recently, however there has, I think, been a trend back toward surgery away from indiscriminate medical treatment if you will, and toward well planned surgery in cases with accepted indications for surgical interference. The exact and proper percentage of cases requiring surgical interference is still to be determined but there is no doubt that it should include about 20 per cent of all cases.

What are the criteria for surgical interference from the point of view of the internist? An answer to this question is necessary, inasmuch as those of us who are interested in the practice of internal medicine have frequently the duty of making a decision even before the surgeon sees the patient. We are the ones who ought to make

*The section meeting was held and the following four papers read during the annual meeting of the Massachusetts Medical Society, Worcester, Massachusetts, June 8, 1939.

†Assistant Professor of Medicine, Harvard Medical School; physician, Massachusetts General Hospital.

the decision in favor of operation. One indication for surgery is obviously that of acute perforation, and this is generally accepted. A second is that of complete pyloric obstruction. It is also agreed that hemorrhage, in the broadest sense of the term, is frequently an indication for surgery. A fourth indication, which is much more difficult to define but which is perfectly distinct, may be described as a failure of medical treatment. Two other indications should be mentioned: the finding of a gastroduodenal ulcer, and the finding of a gastric ulcer about the nature of which there is some question. Wherever there is real doubt as to whether or not a gastric lesion is malignant, surgical treatment is the only proper approach.

These are the main indications for surgical interference in the treatment of ulcer. An acute perforation is obviously a surgical emergency, but I should like to mention one or two points about this condition. There is an occasional case in which a diagnosis has not been made until four or five days after perforation has occurred. Under such circumstances, I think that most of my surgical colleagues will agree that Ochsnerization and conservative measures may at times be the proper methods of treatment.

One or two diagnostic points are also of some interest in this connection. A perforated ulcer, whether gastric or duodenal, is frequently associated with pain in the shoulder, and this may be the outstanding symptom. Pain referred to the region of the trapezius, in connection with an acute intra-abdominal emergency, should immediately make one think of a perforation of a viscus, most probably in the stomach or duodenum, with some leakage under the dome of the diaphragm. Another situation not so well recognized is the occurrence of pelvic pain in relation to perforation of a gastric or duodenal ulcer. Occasionally such patients do have acute pelvic pain, frequently leading to a diagnosis of acute salpingitis or acute appendicitis, although a careful but brief history would immediately indicate the fact that the patient has a chronic ulcer. This combination of a typical history of ulcer and an acute episode of pelvic pain should suggest the possibility of a perforated ulcer, with drainage of gastric or duodenal contents into the pelvis and local peritoneal inflammation. Needless pelvic or appendiceal surgery would thus be avoided. When a small perforation is suspected, abdominal plates in the horizontal and vertical positions will frequently demonstrate a gas bubble and give a clue to a diagnosis of ulcer.

As to obstruction, there is no doubt that in this event surgery is indicated, but the question always arises as to whether or not there is complete obstruction. In this connection, certain things should

be mentioned. In the first place, one may have traces of barium in the stomach for as long as twenty-four hours after its administration, without any organic disease of the pylorus being present. Such retention may depend entirely on emotional disturbances, and is not in itself conclusive as evidence of organic disease. The x-ray diagnosis of pyloric obstruction, therefore, should always be carefully checked, and should not be taken alone as an indication for surgical interference.

Rarely one encounters postpyloric obstruction, if such a term may properly be used. This is due at times to disease of the gall bladder and resulting inflammatory reaction around the duodenum, pulling it up toward the gall bladder, with kinking and at times an almost complete obstruction. If suspected, such a diagnosis can occasionally be made prior to operation.

Queer deformities of the duodenum well beyond the pylorus, with partial obstruction, always require an adequate history, with particular reference to biliary colic and adequate cholecystography. When pyloric obstruction is associated with the presence of an acute ulcer in or near the pyloric valve, it is extremely important to treat the ulcer medically for a reasonable period of time, with the patient under close supervision. Frequently one finds that gastric stasis disappears under proper medical management, even though the obstruction at first appears to be complete. Such measures are particularly valuable because of the generally accepted fact that gastroenterostomy, as a rule, is the surgical procedure of choice in the presence of complete pyloric obstruction. When pyloric obstruction is not complete, gastroenterostomy is frequently a failure, and it is therefore absolutely necessary to establish beyond doubt the degree of obstruction before determining the necessity for surgery or the nature of the operation to be employed. With a sufficient degree of stasis, there is no doubt that surgery is indicated.

I must emphasize, however, that in the presence of pyloric obstruction one is often dealing with a poor-risk patient. Obstruction itself naturally results in undernutrition, loss of electrolytes, protein deficiency and the danger of postoperative edema, so that adequate preparation is essential in many of these cases before operative measures are considered. Replacement of electrolytes with normal physiological saline solution and replacement of serum protein by blood transfusion are always advisable, and in some cases jejunostomy may be seriously considered as a proper maneuver, for the purpose of providing adequate nutrition before any gastric surgery is attempted.

Hemorrhage I shall mention only in passing, because it is too large a subject for discussion. Acute

massive hemorrhage is not as a rule an indication for surgery. The risk to patients under forty five years of age is minimal, whereas that of surgical intervention is great. In patients over forty five, the mortality from hemorrhage increases rapidly and there may be an occasional case where surgical interference, if the site of the lesion is known and if the patient is under proper supervision, is indicated. This group of patients, however, is very small, and even here the risk of emergency surgery performed to stop bleeding is so great that it should always be avoided if possible. With in forty-eight hours after massive hemorrhage the decision must be made as to the course to be pursued, and surgical measures, if indicated, should be attempted at no later date.

I may say a word here about transfusions. There is no doubt that they help in the treatment of massive hemorrhages and are a valuable means of combating shock, and if properly given they do not raise the blood pressure. Citrate transfusions given by the direct method, can be used with complete satisfaction. If several transfusions have been given, surgical intervention is probably unwise. I believe that my surgical colleagues will agree that the administration of several transfusions practically precludes surgery, inasmuch as such patients do not stand operation well. Therefore, it is of the utmost importance to come to a decision as to the method of treatment within twenty-four to forty-eight hours after massive hemorrhage has occurred. On the other hand, repeated gross hemorrhages undoubtedly constitute an indication for surgery, but this should be an elective operation with proper preoperative preparation.

The most difficult decision in ulcer therapy is that of advising surgery because of the failure of medical treatment. Such a decision obviously can be made only on the basis of long experience. Patients who have not done well after prolonged medical treatment, because of their failure to follow the prescribed treatment or because of social or economic factors, or because in spite of really adequate medical treatment the ulcer is intractable, deserve surgery. Such surgery should be undertaken with the idea of giving the patient more adequate protection against recurrences, and should therefore be performed only after very thorough consideration. In such cases, however, the most radical surgery is probably the most conservative, and hence the operation should be limited to subtotal resection.

I believe that there is another place for gastroenterostomy in addition to the indication already mentioned,—pyloric obstruction. There are a few patients who do not have such obstruction and who constitute poor surgical risks because of as-

sociated cardiac or pulmonary diseases, and yet have intractable ulcers. These patients are usually if not always in the later decades of life, and the risk of major surgery (subtotal resection) is much greater than that of gastroenterostomy. In this group of cases there is still an occasional one where gastroenterostomy is the operation of choice.

The reasons for the failure of surgery, I think, are three—the unwise choice of the patient, of the type of surgery and of the surgeon. First, one must size up the individual patient—his psychological reactions, his business and social background, the stress and strain to which he is subjected and his ability to carry out orders. If after thorough consideration of these factors it seems certain that the patient will be unable to carry out any reasonable medical regime, a reasonable corollary is that surgery, too, will be ineffective and that recurrences may be encountered. Second selection of the type of surgery needed in the individual case involves the criteria mentioned above in discussing complete or incomplete pyloric obstruction hemorrhage and so forth. Finally in major gastric surgery it is of the highest importance to choose the proper surgeon for such surgery involves a technic calling for extreme skill and wide experience.

* * *

In spite of all the surgical and medical skill available, peptic ulcer is still a chronic recurrent disease in the sense that a cure for it cannot be guaranteed, regardless of the type of treatment. One should never forget that after all the disease may recur, even if an almost complete gastrectomy has been done, and that no matter how radical the surgery, the patient must continue under medical supervision of some sort.

GASTROSCOPIC EXAMINATION*

EDWARD B. BENEDICT, M.D.†

BOSTON

SINCE the advent of the Wolf-Schindler flexible gastroscope,¹ which was first used in this country at the Massachusetts General Hospital six years ago,² our conception of gastric disease has undergone considerable change. We now actually see the inside of the stomach in health and disease and can observe changes in the gastric mucosa which are not demonstrable by any other method of examination. Gastroscopy is a safe procedure, easily performed in the office or outpatient depart-

From the Massachusetts General Hospital.

*Assistant in surgery Harvard Medical School; assistant surgeon, Massachusetts General Hospital.

ment, and well tolerated by most patients. The correct interpretation of gastroscopic findings, however, requires much experience, and the examination should therefore be in the hands of a few well-trained gastroenterologists.

CHRONIC GASTRITIS

By the frequent use of the gastroscope both here and abroad it has been shown that chronic gastritis is the commonest disease of the stomach.³⁻⁵

Chronic gastritis is of great importance to the surgeon for the following reasons: massive hemorrhage may come from gastritis alone⁶; severe gastritis associated with gastric or duodenal ulcer may be an indication for or against operation, depending on the degree and location of the gastritis, and postoperative gastritis is sometimes the cause of serious symptoms and its presence may be an indication for further surgery.

Hemorrhage from Gastritis

In a previous report⁶ the complication of hemorrhage has been emphasized. It may be slight, severe or occasionally fatal. Gastroscopically it is usually possible to demonstrate a red, edematous mucosa, exudate between the folds, submucosal hemorrhages and mucosal erosions, sometimes with active bleeding. Such patients have occasionally in the past been subjected to laparotomy and nothing found. By gastroscopy it is possible to show that the bleeding is coming from a severe gastritis, often involving almost the entire gastric mucosa. Because of the extent of the disease and its generally good response to medical treatment, surgery is usually contraindicated.

CASE 1 S C (M G H No 133540), a 51-year-old man who complained of repeated attacks of weakness and pallor, was referred for gastroscopy. On admission the patient appeared poorly nourished and sallow. The red cell count was 1,800,000, and the hemoglobin 32 per cent. Gastric analysis after administration of histamine showed no free acid. Benzidine tests on the gastric secretion and on the stools were strongly positive.

Gastroscopy was performed on June 9, 1938. Preliminary drainage of the stomach yielded 4 cc. of dark red blood. Because of angulation the pylorus was somewhat difficult to see, but it appeared entirely normal. The antrum and lower part of the body had a diffuse, mottled, red gray appearance. Lying on the greater curvature in the body of the stomach was a large, dark red blood clot of irregular shape. There was a small amount of bright-red blood. Also in this region on the posterior wall in the upper part of the body there was a definite verrucous appearance and superficial erosion. There was no evidence of ulcer or neoplasm. The findings indicated superficial and hypertrophic gastritis with erosion and hemorrhage.

Gastroscopy was repeated on June 30. Preliminary drainage of the stomach yielded 4 cc. of very thick, bloody secretion. The view was again obscured by the presence of blood in the stomach. So far as could be determined, there was no ulcer and no neoplasm. Because of the

presence of blood, however, I did not believe that all parts of the mucosa had been satisfactorily examined, and therefore thought that the patient should still be carefully watched and studied, by both x ray and gastroscopy, for further developments. The mucosa, however, appeared distinctly better. No superficial erosions were visible at this time. There was still evidence of superficial and hypertrophic gastritis. As we have had a number of patients bleed very severely from gastritis alone, it is quite possible to explain this hemorrhage and other symptomatology on such a basis.

In spite of a very careful medical regime, further bleeding occurred, so that readmission was necessary 6 months later. X ray examination on January 3, 1939, showed a normal esophagus. The stomach was high in position, smooth in outline, with good peristalsis, and showed no residue after 6 hours. The rugae appeared thickened. The impression was that of hypertrophic gastritis.

A third gastroscopy was performed on January 19. The



FIGURE 1 Case 1

Severe extensive chronic gastritis with erosions and active hemorrhage. Surgery is contraindicated as the process is too diffuse. X ray treatment was given with benefit.

pylorus was not seen. Peristalsis was normal. The mucosa throughout presented a hemorrhagic appearance, with multiple erosions and blood clots throughout the antrum and body, extending well up to the cardiac orifice. The mucosa throughout was reddened and showed areas of submucosal hemorrhages, as well as hemorrhagic erosions. It appeared very fragile and presented many wart-like excrescences typical of hypertrophic gastritis. The rugae also presented a markedly beaded appearance. The process was very diffuse and severe. The findings were those of a chronic superficial and hypertrophic gastritis, with multiple erosions and hemorrhages.

I advised a trial of x ray treatments in an effort to stop these hemorrhages, with the idea that, if this were unsuccessful, gastric resection might be necessary, though the process was so diffuse that almost a total gastrectomy might be required. Four x ray treatments were given on successive days to the epigastrium, the total dose being 520 r. The bleeding was controlled and the patient gained 15 pounds in weight.

This case represents severe hemorrhage from extensive chronic gastritis (Fig 1). Accurate diagnosis was possible only by gastroscopy. There was definite benefit from x ray treatment. Surgery was not indicated, as the process was too diffuse.

Severe Gastritis with Duodenal Ulcer

Gastritis is frequently seen associated with gastric or duodenal ulcer. A knowledge of the degree and location of the associated gastritis should be one of the important factors to influence the surgeon in deciding for or against operation, and in planning the type of operative procedure. If a diffuse gastritis is present, or severe gastritis of the fundus, probably neither a gastroenterostomy nor a radical operation will be indicated, for the gastritis of the upper part of the stomach will persist and continue to give symptoms. If there is no gastritis, a simple gastroenterostomy or pyloroplasty may be sufficient. If gastritis is localized in the antrum resection may be indicated.

Case 2. S. L. L. (M. G. H. No. 163982) a 25-year-old man, was admitted to the hospital complaining of epigastric pain and vomiting of 7 years duration which had been relieved by diet.

Examination showed slight epigastric tenderness. The red-cell count was 5,000,000 and the hemoglobin 100 per cent. Guaiac tests on vomitus were positive to strongly positive.

X-ray examination on November 28, 1938 showed the esophagus to be normal. The stomach contained a moderate amount of secretion. The rugae were not appreciably thickened. No defects were present in the stomach. The first portion of the duodenum was quite irritable, and it was constantly deformed. In the central portion of the cap about 1 cm. beyond the valve there was a constant crater probably on the posterior wall. At the end of 6 hours the stomach was empty. Some barium from the motor meal lay in the cecum. The findings were those of active duodenal ulcer probably of the posterior wall. Repeat x-ray films on February 20, 1939 showed that the stomach was cascade shaped. The pylorus opened readily and a cap with marked deformity was filled. There was a narrow pouch toward the greater curvature and a large pouch on the lesser curvature. The crater previously described had decreased in size, but was still visible. The findings were those of marked scarring due to duodenal ulcer which was still active. Another examination on March 9 showed the esophagus and stomach as before. The pylorus opened readily filling a cap which if anything was slightly smaller than at the previous examination. The pouches at no time filled to the extent noted at that examination. No ulcer crater could be definitely demonstrated.

The patient's course in the hospital was unsatisfactory. He was uncomfortable and vomiting. Surgery was seriously considered.

Gastroscopy was done on March 17. Preliminary drainage of the stomach yielded 30 cc. of clear slightly greenish material, which contained free hydrochloric acid. Prepyloric contraction was seen but probably not quite down to the pylorus. There was no peristalsis. The mucosa throughout showed increased reddening but otherwise the antrum appeared normal. Throughout the body

and upper part of the stomach the mucosa showed a very marked verrucous appearance with beading of the rugae, particularly on the lesser curvature, posterior wall and greater curvature, with numerous areas of blotchy reddening and three or four erosions about 5 mm. in diameter. There was no active bleeding. I believed that the gastritis in this patient played an important part in his symptomatology. It was so extensive that gastric resection would not remove all of it; moreover there would be the usual postoperative gastritis after resection. On this account, and also because of the gastric acidity and the temperament of this patient, it seemed to me that surgery should be avoided if possible. I believed that the youth of the patient was also against a good surgical

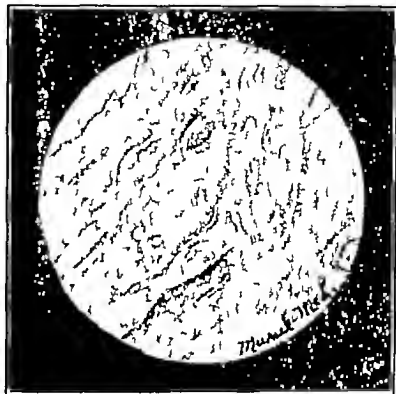


FIGURE 2. Case 2

Severe diffuse gastritis associated with duodenal ulcer. The extent and location of the process were contraindications to surgery. The symptomatology did not clear up with the healing of the ulcer but with the healing of the gastritis (Fig. 3).

result. He had apparently never been very co-operative, but I thought that if the situation were carefully explained to him, and if he were carefully followed in the Gastrointestinal Clinic, he might be brought under fair control medically. I advised complete elimination of tobacco and an absolutely rigid schedule of meals by the clock, with powders if necessary. If the patient could not follow this rigid schedule without operation I did not expect that he would do well after an operation.

Gastroscopy was repeated on April 4. Preliminary drainage was not done. At this examination the mucosa showed very marked improvement. There was only one area on the posterior wall of slightly blotchy reddening and slightly verrucous appearance. Otherwise the mucosa appeared almost normal.

Continuation of medical treatment was advised and on April 16 the patient was discharged home, symptom-free.

In spite of the fact that this patient's ulcer had apparently healed by x ray on March 9, his symptoms persisted and gastroscopy demonstrated the presence of a severe gastritis (Fig. 2). Surgery had been seriously considered, but when the extent and

severity of the gastritis were demonstrated it was decided not to operate. The clinical improvement three weeks later coincided with the improvement in the gastric mucosa shown by gastroscopy (Fig 3). In this case, then, the gastroscopic finding of

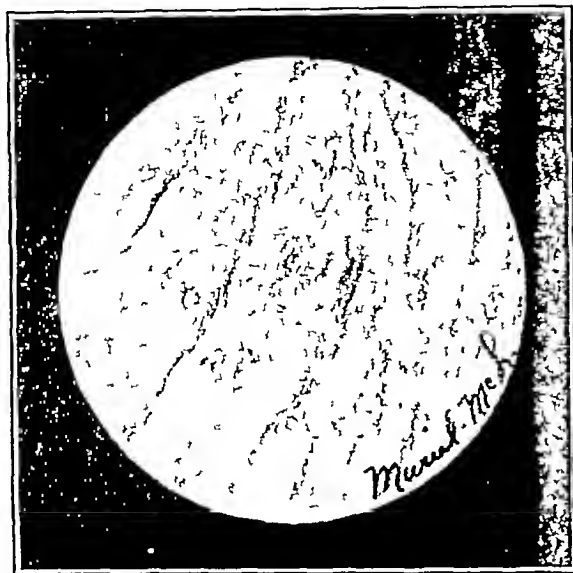


FIGURE 3 Case 2

With the healing of the gastritis, as shown in this illustration, there was an improvement in the symptomatology

a severe generalized gastritis was important in explaining the continued symptomatology after the apparent healing of the ulcer, and in contraindicating surgery.

Postoperative Gastritis

Pathologic changes in the gastric mucosa are not infrequently found in the stomach postoperatively. Sometimes, though not always, postoperative gastritis is the cause of severe symptoms. When it can be shown gastroscopically that the gastritis is localized in the region of the stoma, further surgery may be indicated.

CASE 3 C S H. (P H. No 1312), a 46-year-old man, had had a pylorectomy and posterior gastroenterostomy in 1929 for perforating duodenal ulcer. He entered the hospital complaining of repeated attacks of hematemesis and melena of 3 years' duration, with no evidence of ulcer by repeated x ray examinations.

Physical examination on admission was essentially negative. The red-cell count was 4,000,000 and the hemoglobin was 75 per cent. The clinical impression was that of bleeding from the duodenum.

Gastroscopy was performed on January 19, 1939. Preliminary drainage of the stomach yielded 165 cc. of thick, greenish material. Following this, gastric lavage was done. The patient was very co-operative and a good view was obtained. There was a moderate amount of whitish material clinging to the mucosa, particularly in the antrum, some of which might have been barium, but part of

which was probably the exudate frequently seen in post-operative gastritis. The antrum showed superficial reddening, with areas along the lesser curvature of sub-mucosal punctate hemorrhages. Peristalsis was normal, and appeared to pass well down the antrum to the region where the pylorus should be. It appeared from this and from the x ray studies that very little of the antrum was resected at the time of pylorectomy. The gastroenterostomy stoma was not visualized, as it was apparently closed at the time of this examination and lay behind some folds in the mucosa. The greater curvature and posterior wall in the mid-portion of the body of the stomach showed a markedly verrucous and inflammatory appearance, with reddening of the folds, and two erosions 2 to 3 mm. in diameter. The upper part of the stomach also showed a moderate degree of gastritis, but I believed that most of it was in the region of the stoma. The findings indicated a marked superficial and hypertrophic postoperative gastritis with erosions and hemorrhage.

I thought that a large amount of bleeding could come from this patient's gastritis. From the previous operative note it was impossible to conclude how much duodenum had been resected, but I got the impression that at least part of the first portion was resected and the duodenum infolded. I therefore rather doubted the presence of a duodenal ulcer. I believed that the anatomical setup was functionally poor, as it left a blind pouch which emptied poorly, and which had caused a marked gastritis of the antrum and of the region of the anastomosis. I therefore judged that gastric resection was advisable, with removal at least of all the antrum distal to the stoma, and very likely a higher resection to include the stoma and to give a Polya anastomosis. At that time a further part of the first portion of the duodenum could be resected if necessary.

On January 30 a partial gastrectomy was done. The duodenal stump felt normal, with no induration suggestive of ulcer. There were extraordinarily large vessels over the antrum and the region of the anastomosis. There was no evidence of jejunal ulcer. Two thirds of the stomach was resected, together with the involved portion of the jejunum. The pathological specimen was described as a partially opened, pink, hemorrhagic stomach, with rugae normal in number, consistence and thickness, but flecked everywhere with beefy red spots. The pathological diagnosis was subacute and chronic gastritis.

The patient did well postoperatively, and up to June 5, 1939 had had no further bleeding attacks.

In this case the clinical impression was that the bleeding was coming from the duodenum. Gastroscopy, however, showed a severe chronic gastritis with erosions and hemorrhage (Fig 4), especially in the region of the gastroenterostomy stoma. Partial gastric resection confirmed these findings and showed a normal duodenal stump. The pathological report was subacute and chronic gastritis. The patient has remained well with no further bleeding.

From a consideration of these cases of gastritis it should be emphasized that all patients with unexplained gastrointestinal bleeding should have gastroscopic examination. Hemorrhage from gastritis is not uncommon. It is important to determine the extent and severity of the gastritis and

to follow the healing process by gastroscopy. The usual case with hemorrhage from gastritis will respond to rest and dietary measures with iron, liver and vitamin therapy. Schindler,² however, has reported a case of very severe gastritis treated by heavy x radiation. There were many erosions, but no mention was made of bleeding. One year later a marked atrophic gastritis developed, which Schindler attributed to the x-ray treatment. It is too soon to know the final result in Case 1,



FIGURE 4 Case 3

Severe postoperative gastritis with hemorrhage localized near a gastroenterostomy stoma. Resection was performed with good result.

above. Certainly, as Schindler points out, "x-ray therapy should be used only in the most severe cases."

In Case 2 the persistence of symptoms after apparent healing of the duodenal ulcer is of special interest. The relief of symptoms coincided with the marked improvement in the mucosa shown by gastroscopy.

BENIGN ULCER

The gastroscopist can be of aid to the surgeon in the diagnosis and treatment of gastric ulcer³ in the following ways: gastric ulcers, especially the superficial ulcers which are not seen by any other method of examination, may be seen by gastroscopy; the associated gastritis can best be evaluated by gastroscopy; gastroscopic examination is of assistance in differentiating benign and malignant ulcer, and gastroscopy is of value in following the healing process.

Case 4. A. K. (M. G. H. No. 109873) a 51-year-old woman, entered the hospital complaining of abdominal pain and vomiting, often relieved by food or soda. On

examination she showed epigastric tenderness. The red cell count was 5,500,000. Guaiac tests on the stools were strongly positive.

X-ray examination on February 17 1938 showed a crater 2.5 cm. in diameter on the posterior wall of the stomach just below the cardia with marked surrounding induration. There was marked convergence of the rugae toward the ulcer. The floor of the ulcer contained an irregular filling defect, possibly due to blood clot or to food. The cap did not fill during examination. No stress was laid on its demonstration on account of the preceding hemorrhage. The gross findings were those of a large, benign ulcer in the area described. Re-examination after medical treatment was suggested.

Gastroscopy was performed on February 23. Preliminary drainage yielded 7 cc. of cloudy mucus which contained no free hydrochloric acid. The pylorus was well seen and appeared normal. Peristalsis was rather sluggish. The antrum was normal. There was a verrucous appearance of the anterior wall in the lower part of the body of the stomach with a beaded appearance of the rugae. Above this area on the anterior wall was an irregularly shaped ulcer about 0.5 by 1.0 cm. in diameter, with a clean, white base and very slightly reddened margins. There was no depth to the ulcer and the margins were very sharply outlined. There was no induration in this region. On the posterior wall close to the cardia was a large, very deep ulceration with a fairly smooth grayish-white base, and sharply defined slightly undercut margins. The lesion itself appeared to be circular and from 2 to 3 cm. in diameter. The surrounding mucosa looked normal and not nodular. There was one very large fold running transversely directly from the large posterior wall ulcer to the small anterior wall ulcer. Distal to this fold was a lake of mucus. From this examination I concluded that both ulcers were benign.

X-ray examination was repeated on March 21. The large ulcer had markedly improved. It was thorn-shaped, and measured about 1 cm. across the base and not quite 1 cm. in depth. There was marked convergence of the rugae toward the ulcer. The surrounding swelling involved only about one quarter of the area it had involved on the previous examination. The patient showed improvement with gain in weight, and by x-ray examination on September 26 the ulcer was seen to have further decreased in size, although it was still visible.

Gastroscopy was repeated on October 6. Preliminary drainage of the stomach yielded 15 cc. of thick grayish yellow secretion, which contained free hydrochloric acid. The pylorus was only partially seen through the angulus, but appeared normal, and on the lesser curvature was a grayish-white patch 1 cm. in diameter appearing somewhat like leukoplakia. On the anterior wall in the middle of the body of the stomach was a punched-out ulcer with clear-cut, gray margins and clean, gray base, apparently healing. The rugae seemed to converge toward it, and the ulcer appeared to be about 2 to 3 mm. deep with high folds surrounding it. There was a very marked cobblestone appearance in this region. On the posterior wall near the lesser curvature, fairly high up and about 4 cm. from the cardia, was another elongated ulcer lesion about 2 by 1 cm. in diameter which appeared very similar to the ulcer just described. The cobblestone appearance was also marked in this region and in fact quite generally throughout the body of the stomach with increased redness. The findings indicated an anterior wall and a posterior wall ulcer both of which were probably benign and surrounded by very marked hypertrophic gastritis. In view of the presence of these ulcers for 8 months under

careful treatment, and the marked cobblestone appearance near the ulcers, malignancy could not be excluded. The presence of free acid and the absence of symptoms were somewhat against a diagnosis of carcinoma, but not conclusively. The posterior wall ulcer was so high up that surgery would have been difficult.

A third gastroscopy was done on November 17. Preliminary drainage of the stomach yielded nothing. The examination was confined chiefly to the upper part of the stomach. The ulcer on the anterior wall had completely healed, and that on the posterior wall appeared very shallow and about 0.5 cm. in diameter, with a reddening of the mucosa, convergence of the rugae and a cobble-

stone appearance. The last gastroscopic examination showed complete healing of the ulcer on the anterior wall and marked improvement in the large ulcer on the posterior wall. Gastroscopy also revealed a very marked associated gastritis.

MALIGNANT ULCER

The differential diagnosis between benign and malignant gastric ulcer is often difficult and sometimes impossible. Every means at one's disposal should be employed to make this diagnosis. Gastroscopic examination is a valuable aid in this respect. An ulcer with a clean base and sharply defined margins is probably benign, whereas an ulcer with a dirty base and nodular margins is almost

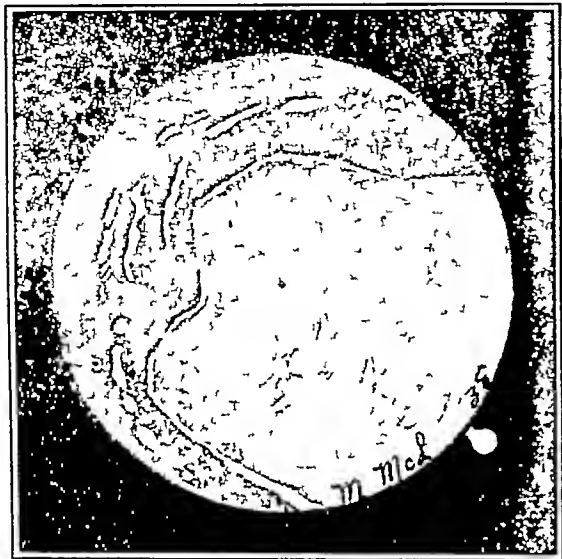


FIGURE 5 Case 4

Large posterior-wall gastric ulcer shown by gastroscopy to have sharp margins and a clean base and to be benign

stone appearance in this region. The findings indicated a very marked improvement since the previous examination. There was no evidence of malignancy.

Re-examination of the stomach by x-ray on December 1 showed the area previously described to have further regressed. There was mere convergence of the rugae, with a small pooling of barium that might have been due to the puckering of a scar. The stomach in this area showed beginning hourglass deformity.

The patient was symptom free until February, 1939, when she developed carcinoma of the cecum, which proved to be inoperable.*

In this case gastroscopy contributed valuable additional information in four respects. It showed the lesion to have sharply defined margins and a clean base, so that malignancy was made to appear very unlikely (Fig 5). A second ulcer, not previously suspected, was demonstrated (Fig 6). The demonstration of multiple ulcers is important in itself, but particularly so when the question of malignancy arises, for multiple malignant ulcers in different parts of the stomach are extremely rare, whereas multiple benign ulcers are not un-



FIGURE 6 Case 4

Small anterior wall gastric ulcer in same patient. This ulcer was demonstrated only by gastroscopic examination

surely malignant. As Schindler³ has pointed out, the presence of the circulating blood in the living tissue is of great help to the gastroscopist.

CASE 5 G E W (M G H. No 132669), a 43-year-old man, was admitted to the hospital complaining of right-sided abdominal pain, with vomiting of 14 months' duration. On examination there was tenderness in the epigastrium. Analysis of the fasting content of the stomach showed 13 units of free hydrochloric acid. One half hour after administration of alcohol and histamine the gastric secretion showed 36 units of free hydrochloric acid.

X-ray examination was done on October 25, 1938. The esophagus showed no evidence of varices. The upper part of the stomach was normal. On the lesser curvature just above the antrum there was an ulcer crater 4 cm. in diameter, which extended into the stomach wall for 2 cm and was surrounded by a marked zone of edema. The stomach below this ulcer and the duodenum showed no evidence of disease. The ulcer seemed grossly benign, but malignancy could not be ruled out.

Gastroscopy was performed on November 10. Preliminary

*At autopsy performed at another hospital the gastric ulcers had apparently healed. There was no evidence of gastric malignancy.

ary drainage of the stomach yielded 4 cc. of slightly bloody secretion which contained free hydrochloric acid. The pylorus and antrum appeared normal. Peristalsis was normal. On the lesser curvature at the angle of the stomach was a large deep ulcer probably 3 cm. in diameter and 1 cm. deep, with slightly nodular margins and a dirty base containing barium and blood clot. The surrounding mucosa was nodular (Fig 7). The gastroscopic appearance, as well as the size of the lesion made me very suspicious of neoplasm and I believed that the patient would have to be explored.



FIGURE 7 Case 5

By showing slightly nodular margins and a dirty base in this lesion gastroscopic examination alone made the correct diagnosis of malignant gastric ulcer

On November 17 subtotal gastric resection was done. The pathological diagnosis was adenocarcinoma. The report in detail ran as follows:

The specimen consists of a subtotally resected stomach measuring 20 by 15 cm., on the lesser curvature of which is an ulcer crater measuring 3.5 by 1 cm. in diameter and 0.8 cm. in depth. This is located 5 cm. from the pylorus. The crater is slightly firm and the mucosa is undermined for 1 mm. The surrounding mucosa shows rather marked gastritis. Microscopic examination shows a broad shallow saucerlike area of peptic ulceration with a fibrinoid membrane and a base of granulation tissue. Just under the edge, at a point where the ulcer slightly undermines the mucous membrane is a small focus, about 5 mm. in diameter of well-differentiated adenocarcinoma. Although it is well circumscribed it shows some degree of invasion of the mucous membrane from below. The balance of the mucous membrane, however, is normal except for evidence of gastritis. No invasion of the blood vessels, lymphatics or perineural invasion can be made out. In view of the small size of the tumor and excellent differentiation the prognosis would seem to be very favorable.

All the clinical evidence to the contrary notwithstanding, the gastroscopic diagnosis of probable malignant gastric ulcer proved to be correct.

CARCINOMA

In a previous report,⁶ it has been shown that gastroscopy is of assistance not only in the diagnosis of carcinoma, but also in helping to determine the location and extent of the tumor, and in differentiating benign and malignant lesions. In the following case of advanced carcinoma the correct diagnosis was first made by gastroscopy.

CASE 6. W. A. (M. G. H. No. 84274) a 67-year-old man entered the hospital complaining of epigastric distress, anorexia and loss of weight of 4 months' duration. Physical examination showed a fatty epigastric mass 4 cm. in diameter with a ventral hernia.

X-ray examination on October 26, 1937 showed a normal esophagus. There was slight hypertrophy of the pylorus muscle, with asymmetry of the immediate prepyloric area. There was slight thickening of the rugae in this area. The whole process was probably due to localized gastritis. The pylorus opened readily. The cap was not deformed. The duodenum was not remarkable. There was marked tenderness above the antrum immediately above the palpable hernia. The examiner suggested checking the antrum 4 weeks after operation for repair of the hernia which was done on October 29.

On January 23, 1938 the patient was readmitted because of abdominal pain of 3 weeks' duration and further weight loss. In spite of these symptoms, the clinical impression was gastric neurosis. X-ray examination was repeated on February 1. It was impossible to palpate the stomach owing to extreme tenderness at the site of the operation. The patient fainted and the examination was discontinued but it was possible to demonstrate an oval filling defect in the antrum about 2.5 cm. in diameter and an elongated pyloric valve.

It was planned to study this defect further when the patient could withstand the procedure. In the meantime, gastroscopy to decide between malignancy, polyps or acute gastritis and ulcer was done on February 5. Preliminary drainage yielded 45 cc. of cloudy, shredded brownish material, which contained no free hydrochloric acid. The pylorus was well seen and appeared normal. The muscle of the sphincter of the antrum appeared like an incomplete circle, with no ring of peristalsis on the aspect toward the greater curvature. Peristalsis was passing over the antrum entirely normally except that no wave seemed to form or carry through on that side. On the greater curvature on the posterior wall in the body of the stomach was a very nodular partly ulcerating and partly necrotic lesion probably 5 cm. in diameter having the appearance of carcinoma. There were marked hypertrophic changes throughout the mucosa. There was little doubt that the patient had carcinoma, probably extending to within 3 or 4 cm. of the cardia.

A third x-ray examination was done on February 7 and showed a lobulated tumor mass occupying the posterior wall of the body of the stomach, where it was seen by gastroscopy. The upper lobe of the mass lay at the level of the cardia, the lower border in the region of the angle of the stomach. Examination was again difficult, owing to extreme tenderness as well as to the large amount of fluid in the stomach. The defect disappeared completely as soon as a little more barium was given. It was not attempted to demonstrate the polypoid lesion previously described in the prepyloric region. The findings were those of a lobulated tumor mass on the posterior wall and a polypoid lesion in the

antrum There was no evidence of involvement of the esophagus

On February 15 a total gastrectomy was performed. Exploration revealed a carcinoma high on the fundus of the stomach, extending to within perhaps 2 cm. of the esophageal opening. In the prepyloric region about 1 cm. from

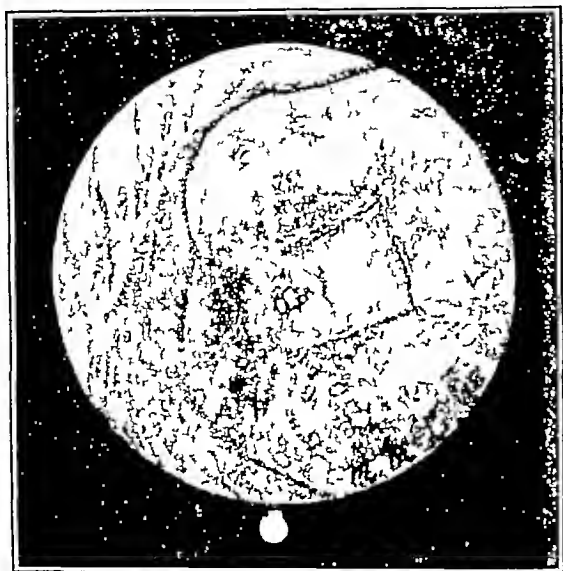


FIGURE 8 Case 6

Advanced carcinoma of the stomach, first demonstrated by gastroscopy and also accurately localized by gastroscopy

the valve was another carcinoma, about 1 cm. in diameter. The pathological report was adenocarcinoma. On February 28, the patient died of general peritonitis.

Gastroscopy here not only first showed the true nature of the disease, an advanced carcinoma (Fig 8), but also accurately demonstrated its proximity to the esophageal orifice. The clinical impression of gastric neurosis in this case emphasizes the danger of making such a diagnosis until all methods of examination at one's disposal have been employed.

CONCLUSIONS

Gastroscopy is a safe procedure, easily performed and well tolerated by most patients, and the information obtained from such an examination is of great value to the surgeon.

Since gastritis is the commonest disease of the stomach and massive hemorrhage may come from gastritis alone, all patients with unexplained gastrointestinal bleeding should have gastroscopic examination. The gastritis which frequently accompanies gastric or duodenal ulcer must be recognized and localized, particularly if surgery is under consideration. Since postoperative gastritis is a definite entity, satisfactorily studied only by gastroscopy and properly treated only after careful study, gastroscopic examination should always

precede surgery of the stomach following a previous operation.

In both gastric and duodenal ulcers the associated gastritis, which may seriously modify the medical or surgical management of the patient, is best studied by gastroscopy. Gastric ulcers not previously suspected have been demonstrated by gastroscopy. The gross appearance of the lesion, whether clean and sharply defined as in benign ulcer, or dirty and irregular as in malignant ulcer, and its response to treatment are points of very great importance that should be studied by gastroscopy.

Gastroscopy is of value in the diagnosis of carcinoma in determining its location and extent, and in differentiating benign and malignant lesions.

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SURGERY OF THE STOMACH*

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LESIONS of the stomach requiring surgical intervention fall into two large classes. Those of a primarily benign nature include simple ulcer, gastrojejunal or anastomotic ulcer, gastrojejuno-colic fistula, polyposis, leiomyoma, gastritis and syphilis. The malignant disorders are carcinoma, sarcoma and lymphoma. It is sometimes impossible to be certain of the diagnosis by our present methods of study. The roentgenologist and gastroscopist, however, have narrowed this doubtful group materially during the last few years. At times the surgeon cannot be sure of the exact character of the tumor at the operating table without the aid of a pathologist. A frozen section, however, is not always feasible, since one hesitates to examine the main growth by biopsy. This makes it necessary to assume malignancy in any lesion under suspicion and to proceed with a wide resection.

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PREOPERATIVE PREPARATION

Patients with surgical lesions of the stomach are likely to appear for treatment in a poor state of health, malnutrition, anemia and general debility are often present to an alarming degree. The very character of the ailment, whether it is due to a benign or a malignant condition, affects the most vital source of well being. Ingestion and assimilation of proper food elements are essential to normal physiology and biochemistry. Rarely does one find a patient with serious stomach disease who has been able to maintain an adequate diet up to the time of admission to the hospital. Thus it becomes necessary to evaluate carefully the nutritional state, the fluid balance and the blood chemical findings of these patients and to correct their deficiencies so far as possible before subjecting them to a surgical operation. In nearly every case a few days, and in some cases a few weeks, of preoperative preparation reduces the operative morbidity and mortality to a notable extent. Many skillfully executed surgical procedures have failed owing to the lack of reasonably normal resistance to infection or to pulmonary sequelae. The incidence of these complications can be materially lowered by restoration of a more normal chemical condition of the body, through the agencies of proper feeding, intravenous solutions and blood transfusions. If possible, one should not be content with combating anemia, fluid loss and protein deficiency by artificial methods alone. Laboratory findings may be within normal limits after these preparatory steps, and the patient may appear to be a good operative risk. The retarded and gradual postoperative feedings reduce this preoperative level so rapidly that failure may result in spite of heroic efforts. In certain cases, one may be justified in establishing a preliminary jejunostomy for feeding, or occasionally planning some other two-stage procedure. The first operation is directed only toward the relief of obstruction. The early administration of food and vitamins soon after operation makes a complementary jejunostomy for feeding of great value. The importance of establishing normal means of nutrition through the gastrointestinal tract cannot be overemphasized. Elements that protect against the trauma of surgery with its subsequent pulmonary and local infection are more adequately distributed to the body cells from this source than through the intravenous feedings available at present.

ANESTHESIA

A correct estimate of the anesthesia problem in gastric surgery is more important than it is

in many other fields. One needs relaxation to expose properly and correct adequately the situation at hand. The high incidence of pulmonary complications from procedures in this area is well known. Whether one chooses local, high spinal or a general inhalation anesthetic, one cannot eliminate entirely the effect of these upper abdominal surgical manipulations on the sympathetic nervous system and on the movements of the diaphragm. Splanchnic block, as advocated by Finsterer¹ and modified by Ogilvie² and others, certainly increases the ease of the operation and the comfort of the patient, and also seems to lower the incidence of postoperative pulmonary and abdominal complications. I use Ogilvie's splanchnic needle and instill 60 cc. of 1 per cent novocain and 0.25 per cent quinine urea solution into the retroperitoneal tissues above the pancreas, between the aorta and the vena cava. Rienhoff³ advocates the use of 100 cc. of 1-3000 Pontocaine solution for this purpose. Close attention to the details of local block of the abdominal wall and of the splanchnic area makes it possible in most cases to carry out a satisfactory gastrectomy without the addition of any inhalation anesthetic. Preliminary medication of $\frac{3}{4}$ gr of Pantopon one hour before operation is helpful. Neither more nor less of this drug, nor the use of other combinations apparently works so well. One needs a co-operative patient whose inhibitions have not been removed, and who is still sufficiently narcotized to bear comfortably a tedious ordeal. With the unco-operative or restless patient, nitrous oxide and oxygen may be added. An intratracheal nitrous oxide, oxygen and ether mixture in a closed machine gives ideal control, but it has not been established that this method has lowered the incidence of postoperative pulmonary complications. Statistics have been compiled to show that postoperative pneumonia was not reduced by local or spinal anesthesia on a mixed group of surgical patients.⁴ The fallacy of such data is obvious when one considers that local anesthesia was used mainly on the poor risk patients. The comparative freedom from postoperative complications in a small group of patients on whom local and splanchnic block anesthesia has been successfully carried out is striking. The technic is at first troublesome and tedious. Considerable practice is required to be reasonably certain of a smooth, painless procedure.

There certainly is less strain on the surgeon when anesthesia can be delegated to another. It is hoped that time will prove that spinal anesthesia with one of the longer acting drugs, such as Nupercaine or Pontocaine, will be as safe for the patient as is local and splanchnic block. So far, my experience

with spinal anesthesia for gastric surgery has been unsatisfactory, supplementary inhalation or Evipal anesthesia has been necessary in most cases. The deep narcosis produced by large doses of morphine and scopolamine, added to barbiturates preliminary to spinal anesthesia and used by some surgeons, seems rather hazardous. One wonders whether patients can tolerate so many drugs with sufficient regularity to warrant their use. Each surgeon must work out for himself the type of anesthesia that he can use with the greatest satisfaction. I certainly admit that there is a variety of choices. Since one third of the failures at the Massachusetts General Hospital have been due to pulmonary complications, it is necessary to attempt to meet this situation the best way one can. I believe that the anesthetic plays a greater role in postoperative pneumonia and pulmonary collapse than does any other single feature connected with the operation and convalescence. In districts where pulmonary complications are rare, the anesthesia problem does not seem to exist. There is also a marked variation in the experience of surgeons practicing in zones where pulmonary sequelae are common. This is better understood when one considers factors pertaining to the selection of patients for operation as well as the circumstances and surroundings in which one works.

BENIGN LESIONS

Ulcer is by far the commonest benign lesion of the stomach that requires surgical interference, although conservative treatment has effectively kept the majority of patients with this ailment in a reasonably good state of health. One must bear in mind that an ulcer may appear innocent by the various methods of study available and still be malignant. Such a patient must be kept under close supervision. Bed rest and a strict bland diet are essential for cure. X-ray examinations must be made as often as every three weeks until the ulcer is completely healed. Too often the clinician has been encouraged by the early loss of symptoms and an appearance by fluoroscopy that the ulcer is growing smaller. The patient under these circumstances may be discharged, to return in three months or later, at which time the lesion is found to be definitely malignant. Thus the opportunity for surgical cure may be lost. It has been shown that all those patients with cancer *in situ* have lived five or more years after surgical resection.¹⁰ One must be particularly suspicious of any ulceration, however small, in the immediate prepyloric region, since rarely does one find benign ulcer in this location. This is also true of ulcers of the fundus of the stomach. On the other hand, ulcerations of the lesser curvature are benign in

two thirds of the cases. This being the most frequent location for such a lesion, the impression is given that all ulcerative processes within the stomach may be considered benign until proved otherwise. The exact reverse of this attitude is the correct one to take, and no ulcer in such a situation should be lost sight of until the lesion has been proved benign.

In spite of the most careful conservative measures, some of these ulcers heal slowly or not at all, or have a distinct tendency to recur with little provocation. A certain number bleed profusely and suddenly as a large blood vessel becomes eroded. As in duodenal ulcer, these patients usually stop bleeding spontaneously on conservative measures if their blood vessels are young enough to allow the formation of a firm thrombosis. So rarely do patients under fifty years of age succumb to hemorrhage that one is always justified in treating this age group conservatively. In those in or beyond the fifth decade of life, one must be prepared to attack the source of the bleeding surgically. If one is going to rescue such an individual, one must make one's decision and proceed with surgery within forty-eight hours after the onset of bleeding. If one treats conservatively by bed rest and repeated transfusions until the patient has lost from his body cells those elements that can be replaced only by the absorption of food from the gastrointestinal tract, and then attempts to operate on him, the chance of success will be very poor. It is safe to say that such a patient with repeated bursts of bleeding, who has been kept alive for a week or more by transfusions, will have a better chance for recovery without surgical intervention. The operation may proceed well, and with plenty of blood transfusions the patient may appear to be in good condition afterward. His depleted state, however, makes the development of pulmonary complications and intra-abdominal infection most likely. If, on the other hand, a patient with acute massive hemorrhage who is otherwise in reasonably good health for his age is immediately hospitalized, the first step toward success has been achieved. By the blood count and hemoglobin determinations, the rate of the pulse and the height of the blood pressure, one can determine what to do next. The shock accompanying the first blood loss may pass quickly, and if the systolic blood pressure is above 70, blood transfusion should be withheld, since Nature is attempting to close the open vessel by clot formation and vessel constriction. Frequently an early transfusion, especially if given rapidly, will elevate the blood pressure and blow out the freshly formed thrombus. However, matched citrated blood must be prepared and kept in readiness in the refrigerator, and be used without delay if there

is evidence by collapse and lowered blood pressure that hemorrhage is continuing or that there has been a new burst of bleeding. If the patient does well and shows no further sign of active bleeding, within forty-eight hours, a conservative regimen may be continued. If, however, bleeding continues or recurs within this time limit, one may assume that one's older patient can be given a better chance for recovery by operation. In my own cases, I have found that one third of the patients beyond the age of fifty bleed to death from an ulcer that bleeds acutely and massively. If operation is undertaken in an orderly fashion on such patients within

upper posterior wall but has rarely become fixed to the pancreas, as it almost invariably does in the same type of ulcer in the duodenum. The eroded vessel is a branch of the left gastric artery. It is very difficult in the mobilized stomach to isolate and ligate these vessels above the lesser curvature when there is a penetrating ulcer. The safest procedure is to control the bleeding by tamponade while the duodenum and antrum are freed. An effective method of controlling the bleeding during the first part of the operation is that of having a second assistant keep firm pressure with his index finger on the ulcer through the anterior wall of

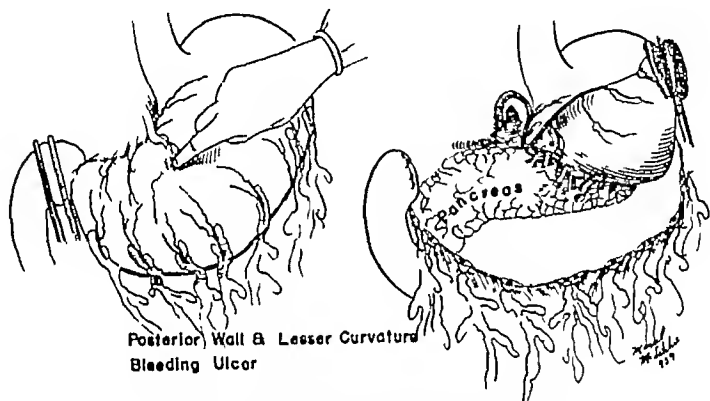


FIGURE 1 Method of Exposure of Left Gastric Vessels in Acute Massive Hemorrhage from Gastric Ulcer

Blood loss from the ulcer can be effectively controlled by an assistant while the stomach is being mobilized

forty-eight hours after the onset of hemorrhage the mortality is little if any higher than it is in gastric resection at a time of election.

The best method of attack on gastric ulcer with acute bleeding is a well planned subtotal gastrectomy. Gastrotomy and a direct attack on the bleeding point by cauterization or deep sutures will control the hemorrhage temporarily. Success of longer than temporary duration by this method can be attributed to Nature's own resources rather than to the operation. If one looks back on any successful outcome by such a maneuver, one will find that one has operated on a patient in the age group where spontaneous recovery could have been expected or on a patient with a small, shallow ulcer that has not eroded a large vessel or has been unusually fortunate. The reason for an indirect attack is sound when one takes into consideration the vessel involved. The ulcer is always on the lesser curvature, it may have extended to the

the stomach (Fig 1). After the distal end of the stomach and greater curvature have been freed and turned upward, it is a simple matter to locate and ligate the left gastric vessels. Transection of the stomach above the ulcer is then accomplished between clamps (Fig 2).

Continuity between the stomach and the intestine is best accomplished by gastrojejunostomy, since the resection should be high enough to include a large proportion of the acid-secreting cells in the fundus. The pylorus should also be removed in order to eliminate the cells of acid excitation. To perform a resection for ulcer, conservative enough to allow the Billroth I gastroduodenostomy, is to take unnecessary risks toward the development of future ulcerations. I prefer a short-loop posterior Polya type of anastomosis, which has given such uniform success that it seems to constitute a satisfactory method. In secondary ulcerations where the primary operation had been

made through the mesentery of the colon, I prefer to accept the disadvantages of a long-loop anterior anastomosis, rather than to subject the new suture line to the scar formation that would be produced by the ragged and traumatized opening in the mesentery. The convalescence at the start may be satisfactory, and it is easier to locate in case of the need of further intervention, but these patients in my experience are prone to have a sensation of heaviness and discomfort, with a tendency to regurgitate duodenal contents until they learn the secret of diet, posture and gravity. One could eliminate many of these early objections by doing an enteroenterostomy between the proximal and



FIGURE 2 Specimen of Stomach Successfully Removed for Acute Bleeding Ulcer of the Lesser Curvature

The open eroded vessel can be seen near the left margin of the ulcer crater

distal loops of the jejunum, and when this type of anastomosis is necessary in patients with cancer of the stomach, I invariably add this maneuver. In the patient with ulcer, however, enteroenterostomy should never be used, since it has been demonstrated by animal experiments and clinical experience that this is an ideal situation for the formation of anastomotic ulcer. In gastrectomy for all stomach lesions except those near the pylorus one will find the procedure simplified if the duodenum is freed and transected as the first step in the resection. The added exposure and control of the gastric segment make logical this reverse process to resection for duodenal and pyloric lesions.

Conservative operations for gastric ulcerations have been advocated. These include pyloroplasty with excision of a low anterior wall ulcer, pylorotomy or partial gastrectomy that includes only the ulcer area, V-shaped excision with gastroenterostomy, gastrotomy with cauterization and suture of the ulcer with gastroenterostomy, sleeve resection for ulcers of the pars media, and, in the earlier days, simple gastrojejunostomy or gastroduodenostomy. All these measures have produced successful results in the past. Most surgeons now believe that ulcers which will respond to such methods of treatment are also likely to do well on a conservative medical regimen. Also, one is not sufficiently satisfied concerning the question of malignancy until the pathologist has made sections from all parts of the lesion. One is often surprised to find that one's wide resection for a supposedly benign ulcer has been a happy choice since cancer cells are reported to be present.

In stomal ulcers, I believe that subtotal gastrectomy is the operation of choice. By this is meant a resection of two thirds to three fourths of the stomach. Often it is necessary to resect a segment of jejunum about the old anastomosis. This may be tedious, and the anastomosis between the divided ends should be the next step in the procedure. If the patient is bearing the operation well, one may proceed with the thenceforth simple gastrectomy. If the patient is a poor risk or is not standing the operation well, it is best to resect the old stoma in the wall of the stomach and leave the gastrectomy to a later date. One must be on guard lest the patient had his pylorus transected and sutured at the time of his gastrojejunostomy, since there was at one time a marked preference for this procedure of von Eiselsberg.⁶

In gastrojejunocolic fistula, one meets a situation demanding a great deal of care and thought. These patients are usually in a poor state of nutrition. Often a prolonged period of rest and diet will get them into a suitable state for surgery. A preliminary jejunostomy for feeding solves the problem adequately and should be used more often. Pfeiffer⁷ conceived the idea that the malnutrition was due to the emptying of colonic contents into the stomach rather than to the loss of food directly into the colon. Therefore he performed a right colostomy on 3 such patients, and found that they all gained weight and became good operative risks in a few months. He was also agreeably surprised to find at the second operation that the inflammatory reaction about the stoma had apparently been greatly reduced. Lahey⁸ has accomplished the same purpose by a preliminary ileosigmoidostomy. I⁹ have advocated an aseptic resection of the fistula and in 7 consecutive cases have lost only 1 patient, and

that from pneumonia. Doubtless a preliminary operation of diverting the fecal stream will make the resection of the stoma safer, and with the lack of contamination one might proceed with subtotal gastrectomy at the same time. If the fistula alone is resected and normal continuity is restored,

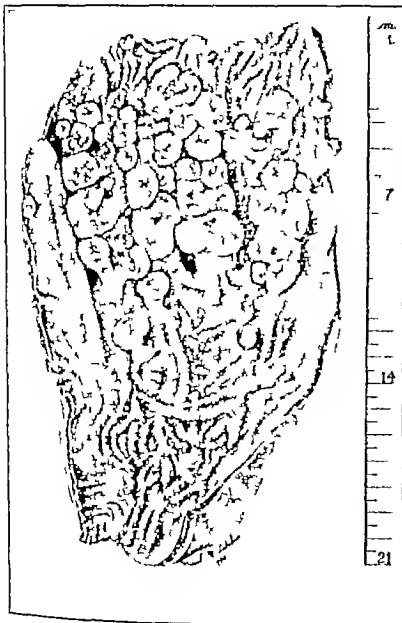


FIGURE 3. Multiple Benign Polyps of the Stomach Requiring Subtotal Gastrectomy

An additional polyp was removed with the cautery from the remaining proximal stomach segment prior to restoration of continuity

the patient will almost invariably reactivate his original duodenal ulcer. Thus, whatever procedures are carried out, the final one should include an elimination of that part of the stomach from the junction of the proximal and middle thirds, to and including the first portion of the duodenum. I am coming to believe that, if one is tempted to utilize the Finsterer¹⁰ resection for exclusion operation for duodenal ulcer, Bancroft's¹¹ modification of removing the mucosa of the remaining distal segment of stomach should be included. The activating cells in the antrum are likely to overstimulate the remaining acid cells in the proximal third of the stomach, with resulting recurrence of ulcer at or above the anastomosis.

Polyps of the stomach, like those elsewhere in

the gastrointestinal tract, are prone to become malignant. Benedict and Allen¹² found that 41 per cent of the gastric polyps at the Massachusetts General Hospital had degenerated into cancer. It is therefore rational to subject a patient with gastric polyps to surgery. Usually these lesions are multiple, and when such is the case one should resect the portion of the stomach involved. This may mean the distal third or distal half only, but occasionally the procedure necessitates a very radical subtotal resection (Fig. 3). If the polyps are single they may have a long stalk, and the tumor may be located where it can occlude the pylorus intermittently. In cases where there is a single pedunculated polyp or a few such lesions not far apart, one may eliminate them by opening the anterior stomach wall and attacking the tumors separately. It is always wise to clamp the base of the stalk well

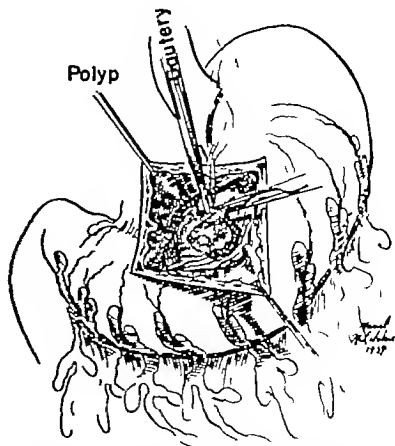


FIGURE 4. Single Polyp of the Stomach Removed with Actual Cautery Through a Gastrostomy Opening

into normal mucosa and to remove the lesion with the actual cautery (Fig. 4). If such a polyp is cancerous it is apt to be of a low grade of malignancy, and although the cancer cells rarely extend into the base of a pedunculated polyp, excision with the cautery gives added assurance that no malignant cells have been left behind.

Leiomyoma of the stomach gives the roentgenologist a characteristic picture. The rounded, mound like smooth tumor with a central depression makes the diagnosis unmistakable. Most of these patients seek advice on account of profuse bleeding. They are usually referred with the diagnosis of ulcer or cancer. They have rarely had gastric dis

tress from food, emotion or fatigue. The hemorrhage is prone to be sudden and profuse, owing to an erosion of the central part of the tumor into a nearby blood vessel. Fatal bleeding occurred in 1 out of every 4 of such cases admitted to the Massachusetts General Hospital in the ten-year period, 1923-1932. In 1 of these patients the lesion, which was located in the pars media, was eliminated by a sleeve resection (Fig 5). In 2 others it was pos-

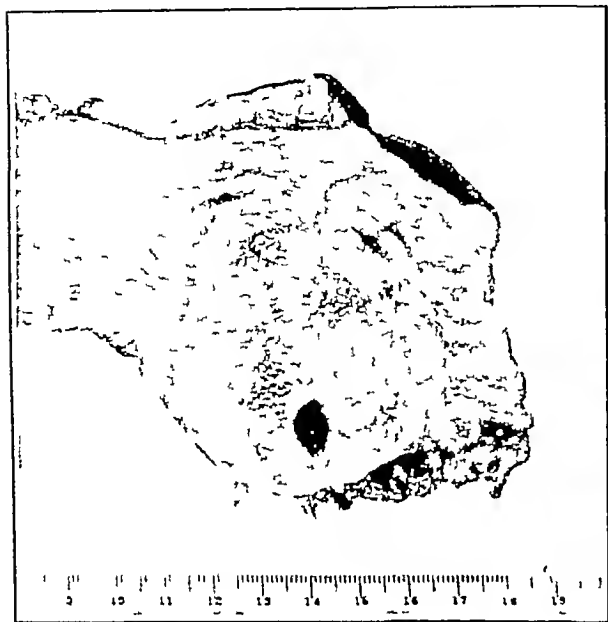


FIGURE 5 Typical Leiomyoma of the Stomach

Note the mound like appearance with the broad base. The dark spot in the center represents a crater which led to an exposed vessel from which profuse hemorrhage had taken place.

sible to remove the tumor with the actual cautery through a gastrotomy, these lesions were high and near the cardia, and were fortunately smaller than the others in the group. In all the other cases that were operated on, it was necessary to resect a segment of the stomach in order to obtain a satisfactory margin of normal tissue. These tumors are usually benign, and complete local excision results in cure.

Gastritis of the hypertrophic type is appearing in the records of the Massachusetts General Hospital much more frequently than it was a few years ago. This has been brought about by better x-ray methods and by the use of the gastroscope. Benedict¹³ has shown that the diagnosis can be made by gastroscopy in cases where the roentgenologist is in doubt. I am sure that many of the distressing symptoms associated with ulcer are due to the accompanying gastritis. There are, however, many patients who have no demonstrable ulceration but have a marked hypertrophic gastritis. One of the

chief sources of difficulty in such a case is repeated profuse bleeding, while other patients bleed more or less gradually and over long periods of time. By far the majority of such cases respond well to a conservative regimen. This includes not only proper dietary measures but rest, freedom from worry and abstinence from alcohol and tobacco. Also, the water-soluble vitamins may play a role in recovery. The marked hemorrhagic tendencies which these patients have make me think that they should all have the blood-prothrombin level determined, and that, if it is found to be low, vitamin K should be given a trial. In patients who have periods of bleeding from gastritis, due to faulty mechanics of previous surgery, radical operation offers the most practical means of restoring them to health (Fig 6). It is my belief that one rarely meets a situation where gastritis alone warrants surgical intervention. If such a patient is invalided and needs to earn a livelihood, and



FIGURE 6 Subtotal Gastrectomy for Repeated Episodes of Bleeding from Gastritis

Pylorectomy, with a Billroth II operation, had been done ten years previously.

cannot for mental, social or economic reasons maintain comfort, he should be given the benefit of a subtotal gastrectomy. The relief obtained in patients who have this operation for a small ulcer associated with extensive gastritis makes me think that the operation is occasionally justified for gastritis alone.

Syphilis of the stomach may be intractable to medical treatment. Also, it is not always possible to be certain that the lesion is not cancer. Therefore, occasionally the surgeon is consulted in such cases. Usually one operates under the impression that the lesion is malignant, and finds the true diagnosis only with the aid of the pathologist. If the lesion persists in spite of adequate antisyphilitic treatment, the clinician begins to

suspect that cancer is the cause. If one could be sure that one were dealing with a gumma and thought that resection was the best method of making the patient comfortable, a less radical operation would be done. In the doubtful cases, however, one proceeds with a radical excision, including the involved lymph nodes. A positive Wassermann or Hinton test does not exclude a diagnosis of cancer of the stomach.

MALIGNANT LESIONS

The statistics of the United States Public Health Service¹⁴ for 1936 report 27,241 deaths from cancer of the stomach in the United States. This represented approximately 19 per cent of all the deaths from cancer reported. In all likelihood these figures do not give an exact picture of the situation, since doubtless many deaths from cancer of the stomach are attributed to other causes. They are of importance, however, from a comparative viewpoint, and show that more people die of cancer of the stomach in the United States than from any other form of malignant disease. Livingston and Pack¹⁵ have recently published a most interesting monograph with much valuable data on cancer of the stomach.

According to Parsons and Welch,¹⁶ during the years 1927 to 1936, 691 patients with cancer of the stomach were admitted to the Massachusetts General Hospital, of these, only 441 were offered and accepted surgical treatment. In the remaining number the disease was found to be so far advanced that nothing could be done for them. In addition to physical findings of distant nodes, usually demonstrated by rectal or pelvic examination, one now has the aid of peritoneoscopy in determining the inoperability of intra-abdominal lesions. Since there is a high mortality from exploratory laparotomy in far advanced cases of cancer of the stomach, one welcomes this simple and effective means of eliminating unnecessary operations. Benedict¹⁷ has been able to determine the operability in approximately 90 per cent of the doubtful cases subjected to peritoneoscopy. It is easy to ascertain the presence of peritoneal implants and liver metastases by direct vision, but impossible to be sure always of pancreatic involvement and fixation.

Of the 441 patients subjected to operation in this group, 171 were considered resectable, and 75 per cent of these failed to leave the hospital alive. 143 were simply explored, and 15 per cent of these died, 127 were given the benefit of a palliative operation, with a mortality of 25 per cent. In the resected cases, 21 per cent of the patients were alive at the end of five years. Ex-

cluding the postoperative deaths, there were 32 per cent of five year cures. In the five year survivals, it is interesting to note that the earlier the lesion the higher the chance of cure, but those patients with symptoms of six months or less were found in a much less favorable condition than were those with symptoms for a year or more. All the patients with carcinoma *in situ* and 62 per cent of those whose nodes were not involved lived for five years or more. Only 16 per cent of those with nodal involvement and 8 per cent of those with fixation of the tumor to other structures lived for five years or more.

Parsons¹⁸ reported on the cases of carcinoma of the stomach entering the Massachusetts General Hospital from 1922 to 1926. In comparing his figures with the more recent ones, we find that there has been an increase of resectability from 27 to 37 per cent, and that the operative mortality has been reduced from 38 to 25 per cent. Although this means a greater number of such patients alive at the end of a five year period, the actual percentage of cures by operation was unchanged. In other words, the better diagnostic and educational methods accounting for a greater number of early cases have been offset by the increasing tendency on the part of the surgeon to attempt extirpation of the advanced lesion.

Surgery is the only form of treatment that has so far been found effective against this disease. Therefore one must bear in mind the possibility of this common ailment, and make diagnoses early enough to increase the number of cures. Ulcerative lesions of the stomach must be most carefully studied and closely followed. If the tendency to advise surgery in a doubtful benign ulcer should become more prevalent, it would in my opinion result in a greater number of lives spared from malignant disease of the stomach. Authorities vary in their opinion concerning the development of cancer in a benign ulcer. It must occur in a certain number of cases, and the percentage is probably greater than the operative mortality of partial gastrectomy for an early lesion.

Resection for cancer should be undertaken with every safeguard for the patient, and should be planned in such a manner that not only the primary lesion but also the nodal areas are included. I have adopted the method of freeing the great omentum from the transverse colon and thus removing lymph nodes that were heretofore left behind. In most cases this actually simplifies the procedure since one can control the blood supply of the whole greater curvature by two principal ligatures on the gastropiploic vessels. After the omentum is freed the duodenum is transected and

the left gastric vessels can then be ligated near their source, thus removing the nodes of this entire area. The stomach should be sectioned between clamps well above the involved area. If clamps are not used, there is an unnecessary amount of soiling from the infected contents of the stomach. Unlike ulcer cases, these cases with malignant disease of the stomach show little or no hydrochloric acid, and therefore virulent microorganisms are usually present. One may try to sterilize such a stomach before operation by washings with dilute hydrochloric acid or by the administration of sulfanilamide. It has been my experience, however, that there is little evidence to support the efficacy of such procedures. The anastomosis of the remaining segment of stomach should be made to the jejunum, since rarely will an adequate resection leave a suitable amount for anastomosis to the duodenum. The posterior Polya short-loop anastomosis is advised if there are no technical reasons against it in any specific case. If there remains a short high segment of stomach and there has been some trauma to the transverse mesocolon during the dissection, it is then better to do a long-loop anticolic anastomosis. Only in the cancer cases can enteroenterostomy between the long proximal and distal limbs of the jejunum be advised. This procedure makes the convalescence easier and eliminates the discomfort of a full duodenum after eating, as well as the disagreeable regurgitation of bile on lying down that many of these patients have. A jejunostomy for feeding is well worth while in these depleted patients. Through this one can administer fluid, food and vitamins within forty-eight hours after the operation. Syphonage from the stomach, if there is any amount over a period of days, can be added to the feedings. The patient can thus be kept nourished until he is able to take an adequate diet by mouth (Fig 7). The Levine tube is left within the remaining segment of stomach until all physiologic ileus has passed, and until one is sure that secretions and food are passing down through the intestinal tract. This may be a matter of several days, usually however, the tube can be removed within three or four days.

Occasionally one finds it necessary to include a segment of the transverse colon in the resection, owing to involvement by direct extension or to interference with its blood supply. In such cases I have usually proceeded with a primary aseptic end-to-end anastomosis of the viable bowel ends, adding a complementary cecostomy. Although many patients withstand this procedure well, it is my belief that there would be less risk by not prolonging the operation to this extent. One might be content simply to bring the bowel ends out through the abdominal wall with the clamps still

in place. It would usually be possible to free the flexures of the colon and suture the two limbs together, leaving a segment at each end, to be separated slightly by abdominal wall sutured between them. This would allow the crushing of the spur within the peritoneal cavity at a later date, as ad-

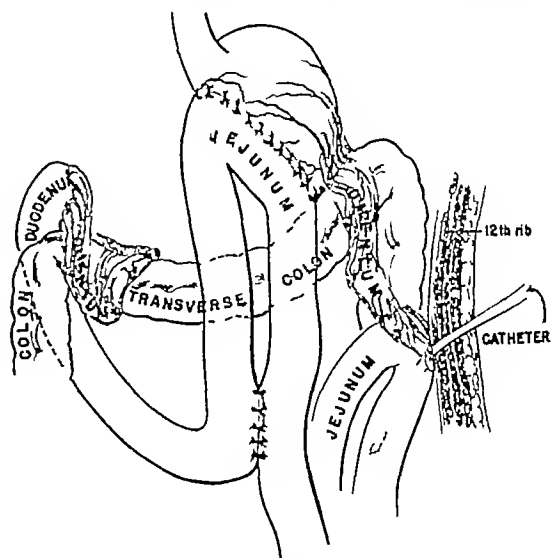


FIGURE 7 Radical Subtotal Gastrectomy for Cancer

The omentum has been removed. The remaining segment of the stomach is too small and too high for satisfactory anastomosis through the mesocolon. The two limbs of the long loop anticolic anastomosis are joined by an enteroenterostomy. Complementary jejunostomy for early feeding is an added safeguard.

vocated by Devine¹⁹ in his defunctioning colostomy.

One may find the tumor fixed to the pancreas. I have frequently removed such attachments with the cautery without mishap. However, attempts in 3 successive cases to extirpate a large segment of the body of the pancreas with the entire stomach have failed—in 2 cases owing to subsequent pancreatitis and in 1 to pneumonia. A proper system of drainage of the pancreas in such a case might result successfully.

Surgeons at the Massachusetts General Hospital have now extirpated the entire stomach in 39 cases. All these operations were for cancer, except in 2 cases, in one of which it was for lymphoma and in the other for a large benign ulcer which was thought to be malignant. The operative mortality has remained at about 50 per cent. One patient lived four years and eight months after operation, and was well and able to work at his regular occupation for most of this time. Respite of varying intervals rewarded the others, and all were spared the very disagreeable slow starvation with persistent nausea that awaits the inoperable patient. The technic of the procedure has been previously described.²⁰ It has been changed very little, other than to include the whole omentum in the resec-

non. The added support of the jejunal loop gained by suturing it to the diaphragm about the end-to-side esophagojejunal anastomosis has been most satisfactory. Suction, maintained from above through a Levine tube lying at the open end of the esophagus, has reduced the incidence of infection. A large enteroenterostomy between the two limbs of the jejunal loop has increased the comfort and safety of the operation, allowing this loop to function more or less like a new stomach. A jejunojejunostomy for feeding has made it possible to sustain these patients satisfactorily until an adequate diet can be taken by mouth. The smoothness of convalescence in most of these cases is remarkable.

Palliative operations for carcinoma of the stomach are disappointing. In fact, a palliative gastroenterostomy adds little if anything to the patient's comfort, because it does not relieve the persistent nausea or distaste for food and rarely prolongs life to any extent. The best palliative procedure is the exclusion operation of Devine²¹ (Fig. 8). This is possible in certain growths involving the lower half of the stomach but so fixed to the liver and pancreas as to make resection impossible. If one can transect the stomach through healthy tissue above the growth, turn in the distal segment and anastomose the normal proximal portion to the jejunum, the patient will get relief of his symptoms. He will often gain weight and obtain a respite of several months. Palliative jejunostomy for feeding is hardly justifiable, in that the symptoms produced by the lesion in the stomach persist, and rarely can a patient be improved in strength and happiness by such a procedure.

Lymphoma, sarcoma and leiomyosarcoma of the stomach should be treated by resection when feasible, since these tumors are often slow growing and long periods of health and comfort may be obtained. In cases of lymphoma, postoperative x-ray therapy is indicated, some of these patients have been kept working at their regular occupations for several years by this combined attack. A second resection of the recurrence is not rewarded by the same respite as that gained by the first procedure, as apparently the host's natural resistance against the disease finally breaks down. Radiation has apparently less effect in the later recurrences, after repeated attempts at retardation have been made by this method of treatment.

SUMMARY AND CONCLUSIONS

Ulcerative lesions of the stomach should be looked on as malignant until proved benign. This means careful treatment, often repeated roentgenograms and very close observation until the lesion is healed.

Polyps of the stomach must be considered as pre-cancerous lesions and extirpated.

Leiomyomas should be resected with a wide margin as soon as the diagnosis is established. Massive hemorrhage is apt to be the first symptom.



FIGURE 8. Transsection for Exclusion of Lesion Too Invasive for Resection.

This is also a good method of dividing the operation into two stages in a poor risk patient.

unless the lesion encroaches on the cardia or the pylorus.

Hypertrophic gastritis rarely causes sufficient disability to warrant surgical intervention.

Carcinoma of the stomach is a commoner cause of death than any other form of cancer in this country. Surgery is the only means of cure at this time. Early diagnosis should be the ambition of every clinician. The earlier the lesion, the lower the operative mortality and the greater the chance of cure.

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SURGERY OF THE DUODENUM*

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IN DISCUSSING surgery of the duodenum the subject of cancer does not have to be considered as it does in other portions of the intestinal tract, since the incidence of carcinoma of the duodenum is reported as 1 in 31,000 autopsies from the General Hospital in Vienna. The essential subject, I think, for me to discuss is that of duodenal ulcer because it represents the commonest, the most distressing and the most serious duodenal lesion.

Since one must draw deductions largely from his own personal experiences, it is of importance to present figures representing our experience at the Lahey Clinic with this lesion. The clinic has now managed, in bed in hospitals, 3670 patients with duodenal ulcers. It is important in discussing surgery of the duodenum to state that of this number only 8.2 per cent were submitted to operation. These figures are interesting in that they indicate a change from our former attitude regarding the incidence of surgery in duodenal ulcer.

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Although we have operated on only 8.2 per cent of the patients with duodenal ulcers, this does not by any means indicate that all the others are entirely well. It does mean, however, that they are so well that there is no urgent demand for operation. They are not suffering from recurrent hemorrhage, the ulcer has not perforated, they are not suffering from pyloric obstruction. Neither are they bothered by symptoms sufficient to interfere with their daily enjoyment of life. The patients who had incapacitating symptoms constitute the 8.2 per cent who were operated on.

Our change in attitude within the last few years regarding the type of operation is also of interest. Previous to 1930 we did three resections to every seven conservative operations in all types of ulcer, gastric and duodenal. Today in duodenal ulcers alone we do seven resections in contradistinction to every three conservative operations. It can be seen that in the last ten years the figures as to conservative and radical operation have been completely reversed.

We do not disagree with the statement already made at this meeting. We believe that when men have had enough experience with this lesion, or for that matter with almost any other, there may be minor differences of opinion regarding the management of lesions, but not major differences about their general management. Therefore, I agree with practically everything that Dr Jones has said.

I know of nothing which has been of greater value to us in the care of patients with peptic ulcer than medical opinions concerning preoperative preparation and the separation of cases into those desirable for surgery and those not requiring surgery, through a trial of medical management and not through primary surgical selection.

I agree with Dr Jones that gastroenterostomy is not a desirable operation. I have repeatedly written and firmly believe that this is not an operation that should be applied routinely to patients with duodenal ulcer. On the other hand, I also agree with him that if the patient is a bad risk it is better to have him alive with a gastroenterostomy, even if the incidence of a subsequent gastrojejunal ulcer is, as we believe it to be, 16 per cent, than to submit him to a more ideal operative procedure that has a hazard, in cases not acceptable for partial gastrectomy, which is altogether too great to be reasonably accepted.

For that reason I feel strongly that the selection of the type of operation for duodenal ulcer must always be made not in the terms advocated by so many European surgeons, namely 100 per cent gastrectomies, but in terms of how well the individual

will stand the operative procedure. That can often be settled with finality only when the abdomen has been opened, when the lesion has been visualized and when all the risks involved have been evaluated. For that reason my attitude toward the operative treatment of duodenal ulcer has always been, not that subtotal gastrectomy should be performed in every case, but that it should be employed when it can be done with a reasonable risk. When this risk seems too high, some of the more conservative, even if less satisfactory, operative procedures should be employed.

As a result of our not inconsiderable experience with subtotal gastrectomy for peptic ulcer—296 operated cases,—we have arrived at quite definite convictions regarding the operative procedure. When we do a subtotal gastrectomy it is not a conservative operation, as will be seen in the illustration (Fig. 1). It includes the removal of three

fourths to four fifths of the stomach. That can often be settled with finality only when the abdomen has been opened, when the lesion has been visualized and when all the risks involved have been evaluated. For that reason my attitude toward the operative treatment of duodenal ulcer has always been, not that subtotal gastrectomy should be performed in every case, but that it should be employed when it can be done with a reasonable risk. When this risk seems too high, some of the more conservative, even if less satisfactory, operative procedures should be employed.

I have noticed in the literature and have recently heard a paper advocating limited pylorotomy for ulcer, this does not seem to me a sound procedure. I think that the accumulated evidence today indicates that, if subtotal gastrectomy is done for ulcer it should be radical. It has been the experience of nearly everyone who has undertaken this operation that with a limited experience, there was a tendency to do conservative resection, and that the end results in these cases were not so satisfactory as those in cases in which radical and high partial gastrectomy was done.

I should like to make one or two points regarding the general management of duodenal ulcer.

The first has to do with obstruction. We have, I am sure, made more mistakes, caused more unnecessary delay and incurred more expense for patients in the matter of obstruction than in almost any other complication occurring in patients with duodenal ulcer. These patients can be put to bed, and under ideal conditions of rest and neutralization an obstructed pylorus can be so relaxed that food will pass through quite satisfactorily. When, however, they go back to work and are under stress and strain, and with the dietary conditions under which they must live, many of them still have recurrence of pyloric obstruction. Because of the fact that we have been able to make the pylorus drain satisfactorily under these ideal conditions, we have in the past, I am sure, occasionally unduly delayed an operative procedure which was probably necessary.

Because of the above situation we have had to set up a definite plan, endeavoring thus to avoid unnecessary expense and delay. Patients who have had obstruction twice and been relieved under rest and neutralization, should obstruction occur a third time under any condition become candidates for surgery. Thus, we believe, is a fair and reasonably conservative approach to the problem of obstruction, and one that tends to prevent unnecessary delay in its surgical management.

The next question is that of perforation of a duodenal ulcer. One hears at times considerable discussion about technical measures for the management of the ulcer itself at the time of perforation. We feel very strongly that our obligation to a patient at a time when the ulcer perforates is to get him through alive. We do not recognize any obligation at this time to undertake procedures such as subtotal gastrectomy directed toward the removal of the ulcer and permanent cure of the



FIGURE 1 Postoperative X-ray Film

This shows the small amount of stomach left after subtotal gastrectomy for ulcer. Note the satisfactory drainage with Hofmeister anastomosis also the complete absence of enteroenterostomy and that the contents of the proximal loop of the jejunum empty into the stomach for neutralization.

fourths to four fifths of the stomach. When we perform subtotal gastrectomy for ulcer we do it for two reasons: to get rid of a large proportion of the acid-secreting glands, and to put back into the stomach by means of the anastomosed jejunum the alkaline jejunal contents. Both these factors are calculated to lower gastric acidity. As we have viewed our cases in terms of good results, we have

condition. From our experience with these cases, we believe that there are sound reasons for this. Not all patients with perforated duodenal ulcers can be operated on early enough so that the hazard to life itself from merely closing the ulcer is not considerable. We are fully convinced that one cannot add the risk of subtotal gastrectomy in the presence of a perforated ulcer without materially increasing the mortality rate. In addition to that, many patients with perforated duodenal ulcers have never had a really adequate trial of medical management before the perforation occurred. Under these conditions one would subject a patient to a major surgical procedure without being certain that the ulcer could not have been managed medically after the perforation had been closed. We are very sure that our first obligation is to save the patient's life by simple closure of the ulcer, unless this produces obstruction. Our next obligation is to determine by an adequate trial of medical management, after the patient has recovered from the perforation, whether the ulcer can be healed without operation. Then, should medical management fail, radical operation in the form of subtotal gastrectomy should be carried out, if the patient's general condition and the location of the ulcer permit.

The points regarding hemorrhage have been well brought out in this discussion. Most hemorrhages occur in duodenal ulcers because most ulcers are duodenal. We have had 9 cases of duodenal ulcer to 1 of gastric ulcer. It is, therefore, largely in this field that the problem of hemorrhage will be met.

As to bleeding from a duodenal ulcer, there are two outstanding points. One is that if operation for hemorrhage is to be undertaken the decision must be made within the first forty-eight hours. The other is, of course, as has been so well demonstrated everywhere, that hemorrhage in patients over fifty years of age is more serious than that in younger patients.

As regards the first position, it has been shown by Finsterer, Taylor and others, that if operation is performed on patients who are having massive recurring hemorrhages from a duodenal ulcer after forty-eight hours, the mortality will be almost prohibitive. When patients have bled recurrently over a period of two days, even though they are repeatedly given transfusions, they are in no condition to withstand major surgical procedures, as a matter of fact, they are usually operated on at this time as a last resort when they are in extremis.

What one should do, therefore, is to make up one's mind within forty-eight hours whether or not a given case is the occasional type of recurrent massive hemorrhage in which it is justifiable to

make an attempt at surgical control. I know of no place in surgery where greater judgment is necessary. This situation has the undesirable aspect of leaving the surgeon with a wish that he had not operated should a fatality occur, and a wish that he had operated should a fatality follow nonsurgical intervention. The outstanding established feature of this situation is, however, that the decision should be made within forty-eight hours.

When Dr. Jones mentioned the fact that this was a technically difficult operation, he brought up a very important point, and one which is extremely difficult to discuss, particularly for anyone in my position. Nevertheless, for the sake of honesty and frankness this needs to be done. I know of no operative procedure that I have undertaken that has been harder to standardize, and in which it has been more difficult to lower the mortality—1 death has occurred in our last 88 consecutive subtotal gastrectomies. There are so many surgeons today who are able to do subtotal gastrectomy for ulcer with a reasonable mortality that I am sure that if I stress the fact that to obtain low mortality rates with this procedure requires a large operative experience with this lesion, I shall not be thought unjustly critical.

It is not the mere sewing that governs the mortality in this operative procedure. It is the management of the ulcer itself, the detachment of the posterior wall ulcer from the head of the pancreas, the decision as to whether or not the ulcer is located so close to the entrance of the common bile duct into the duodenum that it cannot be successfully removed. It is the ability to do sufficiently high resections of the stomach without permitting spilling and soiling from gastric contents. It is the technical management of oozing and bleeding in the head of the pancreas, and particularly the successful management of anesthesia. There are a great number of factors that bring about the mortality in subtotal gastrectomy. It is in my opinion an operation in which experience pays higher dividends than is true of almost any other operation with which I have dealt.

I have listened with interest and well-deserved respect to Dr. Allen's discussion of local anesthesia, and I am sure, basing my opinion on a considerable experience with it, that it is not the best anesthesia for subtotal gastrectomy. I have arrived at this conclusion only after having done a considerable number of subtotal and total gastrectomies with local anesthesia, field block and splanchnic block. There is no doubt in my mind that this type of anesthesia is far superior to any obtained with the general anesthetics, such as ether, intra-tracheal ethylene and intratracheal cyclopropane. In our experience with 415 subtotal and total gas

trecomies for ulcer and cancer we have employed all types of anesthesia,—ether anesthesia, regional and field block anesthesia, with the later addition of splanchnic block, the further addition of intratracheal cyclopropane and ethylene, together with regional anesthesia and splanchnic block. We have for the last four years performed all total and subtotal gastrectomies under 1 1500 Nupercain spinal anesthesia. This type of spinal anesthesia, which was so hazardous when given using a concentrated Nupercain solution, is now, with dilutions of 1 1500, very safe in the hands of those who are skilled and experienced in its administration and is the type of anesthesia now routinely employed in all our total and subtotal gastrectomies.

The proper dose of Nupercain solution is determined from the height and sex of the patient. For operations in the upper part of the abdomen the dosage is as follows: 16 cc. for a five-foot woman and 17 cc. for a five-foot man, for every three inches over five feet, 1 cc. is added, 20 cc. is the maximal dose. For anesthesia in the lower part of the abdomen, divide 100 by the number of the uppermost thoracic nerve segment which is to be anesthetized. The result is the quantity, in cubic centimeters, of Nupercain solution to be used.

Nupercain anesthesia, with 1 1500 dilution, will ensure complete relaxation for two to three hours, and even at times for three and a half. It will produce a slight drop in blood pressure than will Pontocaine or novocain. In our hands it has played a very important part in lowering the mortality and morbidity in these cases, owing to the prolonged relaxation that it produces. I believe that anyone who will try this type of spinal anesthesia, provided it be given by someone expert in its use, will find that it makes possible such relaxation that these difficult technical procedures can be accomplished with greater ease, and thus with fewer postoperative complications and with a lower mortality rate, than with any other type of anesthesia. When one adds to it, as we so frequently do, in travenous Evipal or Pentothal, it becomes from the patient's point of view, almost ideal.

In Figures 2 and 3 is shown the so-called resection by exclusion, as advised by Finsterer. It is an operation that has definitely lowered the mortality rate of subtotal gastrectomy in some cases of very adherent and indurated duodenal ulcers of the posterior wall with which we have to deal. One of the difficulties in the management of an occasional patient with an eroding duodenal ulcer of the posterior wall is that the ulcer and the induration about it have so taken up the duodenal wall that the ulcer is very close to the ampulla of Vater. If it were removed, insufficient duodenal stump

would remain with which to accomplish safe inversion and safe suture of the duodenum. One of the postoperative complications that has resulted in

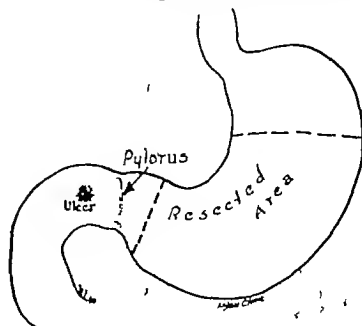


FIGURE 2. Resection by Exclusion (Finsterer)

The area between the dotted lines represents the portion of the stomach to be removed. The stomach is transected at the prepyloric line and turned so, the ulcer and pylorus remaining intact and unremoved.

fatalities in subtotal gastrectomy for duodenal ulcer has been duodenal fistula. This has not occurred in our hands since we have left the ulcer in situ in those cases in which removal of the ulcer and

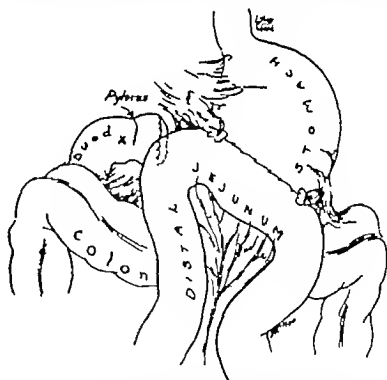


FIGURE 3. Resection by Exclusion (Finsterer)

Note the duodenal stump with ulcer unremoved and the stomach transected prepylorically and inverted. Also note the high subtotal gastrectomy with the remainder of the stomach and the high antecolic Hofmeister anastomosis.

duodenum would have left insufficient duodenum for safe closure. In those cases in which the duodenal ulcer could be removed we have always dissected enough of the duodenum from the pancreatic bed so that it could be safely inverted.

As shown in Figure 3, with resection by exclusion as advised by Finsterer, the stomach is cut

across just proximal to the pylorus and is inverted at this point. A subtotal gastrectomy is then done on the remaining portion of the stomach, accomplishing quite adequately the two desirable factors



FIGURE 4 *External Duodenal Diverticulum*

This is shown within the dotted area, and is safely resectable. Note that the neck of the diverticulum runs behind the duodenum.

in subtotal gastrectomy: removal of a large percentage of the acid-secreting glands and the introduction of alkaline jejunal contents into the stomach. In 21 cases in which this operative procedure has been done there has been one recurrent duodenal ulcer (relieved medically), and the end results have been quite as satisfactory as those in the cases in which the ulcer has been removed.

There will always be, as has been pointed out, some minor disagreement on the part of all surgeons as to the management of these operative procedures. One must, however, have very good reasons for rejecting methods which have already been established. We do not do the posterior anastomosis of the jejunum to the stump of the stomach, as described by Dr. Allen. For a number of years in our cases of subtotal gastrectomy antecolic anastomoses have been done. A long loop of the jejunum has been mobilized and anastomosed to the stomach anterior to the transverse colon. We do no enteroenterostomies between these two long antecolic loops of jejunum. We have given up posterior anastomoses for two reasons. We believe that obstruction takes place less frequently after operation when the loops are brought in front of the transverse colon than when they are passed behind the transverse colon, where there is more opportunity for them to be caught up in adhesions

and exudate and become obstructed. Second, if a gastrojejunal ulcer occurs in the gastric stump after subtotal gastrectomy,—and, no matter what any one says, it will occasionally occur,—reoperation is much easier to perform with the long antecolic jejunal loop than with the posterior anastomosis. In cases in which posterior anastomoses have been done, the inflammatory exudate about the recurrent ulcer is deep on the posterior wall of the abdomen at which point it is extremely difficult to deal with. With antecolic anastomoses, it will be just beneath the abdominal wall anterior to the colon and much easier to approach. We do not do lateral anastomoses between the two loops of jejunum because, if this is done, one essential

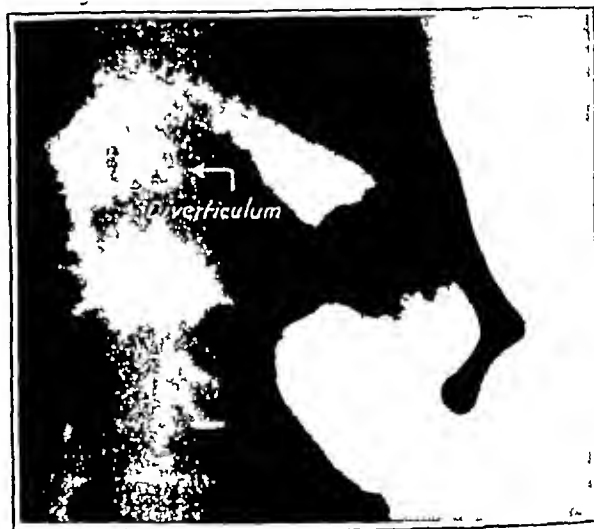


FIGURE 5 *Internal Duodenal Diverticulum*

This arises from behind the duodenum, enlarging inwardly into the head of the pancreas. These are most difficult and dangerous to remove.

principle in the treatment of peptic ulcer by resection is violated. Since one of the things we wish to accomplish in cases of duodenal ulcer is to lower gastric acidity, if an enteroenterostomy is not performed between the long loops of jejunum anastomosed to the stomach, all the accumulated alkaline jejunal contents in the proximal loop of jejunum will be emptied into the stomach, thus neutralizing acidity. If, on the other hand, an enteroenterostomy is done between the proximal and distal loops of the jejunum, following antecolic or even retrocolic anastomosis to the stomach, most of the alkaline jejunal contents that would otherwise pass into the stomach enter the jejunum below it, and so its value of neutralization is lost. I shall now discuss a problem with which we have had considerable experience, namely duodenal diverticulum. We have had some heartaches in learning in which case to operate and in which not

to operate. Many duodenal diverticula undoubtedly do not produce symptoms of sufficient magnitude to justify operation. Occasional cases are encountered in which ulcerations occur, owing to erosion within the diverticulum, or distressing symptoms are present as a result of accumulations within the sac, as in the case shown in Figure 4. In this illustration may be seen the type of diverticulum that lends itself well to operation, and in Figure 5 is shown the type that presents a difficult operative problem. We have learned from experi-

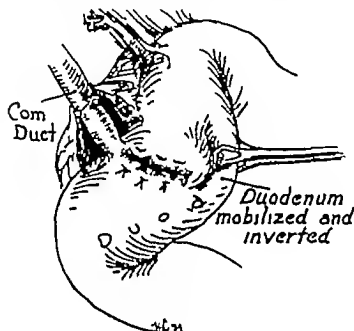


FIGURE 6. Removal of an External Safely Removable Duodenal Diverticulum

The duodenum has been mobilized and inverted and the diverticulum cut off and its neck inverted. Note the relation of the origin of the diverticulum to the point of entrance into the duodenum of the common bile duct. Care must be exercised lest inversion of the neck of the sac obstruct the common duct.

ence with these cases that the diverticula appearing on the outer wall usually have their origin behind the duodenum, but can be approached by mobilizing the duodenum and turning it inward. On the other hand, those diverticula projecting from the inner wall of the duodenum arise from the posterior wall and burrow into the head of the pancreas and into the vascular structures at the angle made by the curve of the duodenum to such an extent that they can be dissected only with the greatest difficulty and often, we believe, with an unjustifiable hazard.

Most duodenal diverticula, even though they appear on the outer wall of the duodenum, arise, as already stated, from the posterior aspect of the duodenum. It should be remembered that the point at which they arise is frequently adjacent to that point at which the common bile duct enters the duodenum. After the diverticulum has been cut off at its neck, one should be extremely careful that inversion of the diverticulum does not obstruct

the point of entrance of the common duct (Fig. 6).

Finally, I wish to present in outline a new operative procedure that may well prove useful to any one who has to deal with gastrojejunal ulcer, with gastrojejunocolic fistula or with carcinoma high in the jejunum. This operation I was forced to develop in order to deal with a carcinoma of the jejunum situated so high that its resection left an

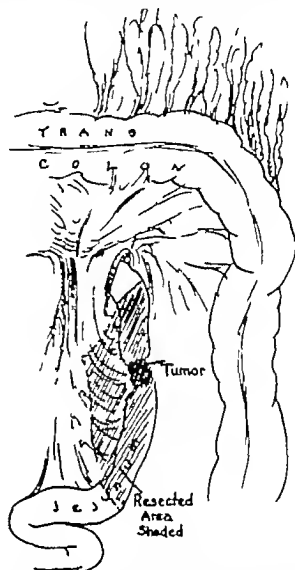


FIGURE 7. Resection of a High Jejunal Tumor

The shaded area of the jejunum distal and proximal to the tumor is to be removed together with the mesentery. Note the short stump of jejunum that will remain.

inadequate peritoneal stump of jejunum for end-to-end anastomosis.

As will be seen in Figure 7 following the removal of an adequate amount of jejunum for carcinoma there was but a small stump of jejunum at the ligament of Treitz, with too short a mesentery and an intraperitoneal portion to permit safe end-to-end anastomosis. Even had it been possible, the anastomosis would have retracted retroperitoneally beneath the vascular mesenteric root, so that there would have been the distinct possibility of obstruction from pressure and the danger of leakage.

After removal of the segment of high jejunum both ends of the jejunum were inverted and reinforced with interrupted silk stitches. The parietal

peritoneum about the upper short stump of jejunum at the ligament of Treitz was then incised, and the stump was pushed beneath the vascular mesenteric root until it was on the opposite side of

right side of the abdomen and then mobilizing the retroperitoneal duodenum has proved of distinct value. The procedure will, I am sure, prove useful for anyone who has to deal with these difficult high jejunal resections in the presence of a short jejunal stump.

As I listen to the discussions in symposiums such as this one, I am impressed with the progress which has been made, particularly in this field. In this as in so many other fields, it is strikingly evident that progress has been accomplished by united efforts rather than by the individual efforts of those interested in the special aspects of these conditions—gastroenterologists, physicians, surgeons, radiologists and anesthetists. In past years a discussion of the treatment of gastric and duodenal ulcers at any medical meeting was certain to bring

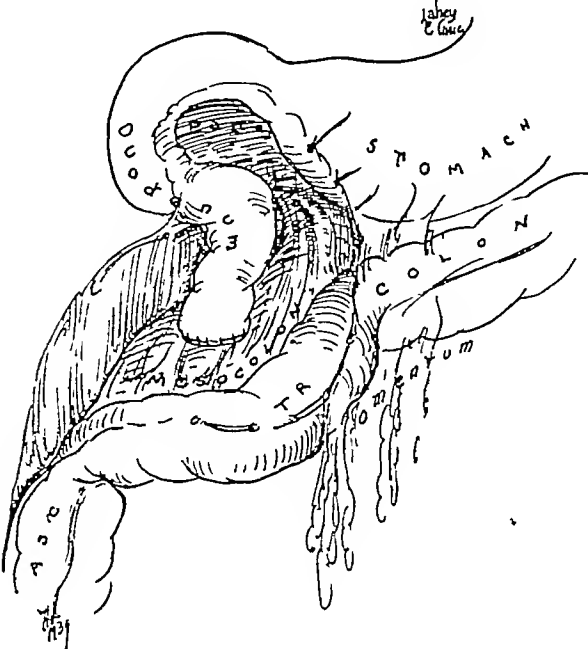


FIGURE 8 Resection of a High Jejunal Tumor

The end of the short proximal stump is safely inverted, the parietal peritoneum freed from it and the stump pushed beneath the mesenteric vessels onto the opposite side. The rent in the parietal peritoneum is then closed.

the mesentery. The incised ligament of Treitz was then closed and the entire right hepatic flexure was turned down by incising its outer leaf of peritoneum. This revealed the retroperitoneal duodenum and the mobilized upper stump of jejunum (Fig 8). When this had been done the mesentery of the retroperitoneal duodenum and jejunum was of sufficient length so that when the transverse colon was put back in place the mobilized duodenum and jejunum could be passed over and in front of the transverse colon, the lower stump of jejunum would be brought up in an antecolic position and a safe lateral anastomosis could be accomplished between the antecolic mobilized duodenum and the jejunum (Fig 9).

These technical procedures are well illustrated by the line drawings. This method has been of value also in cases of jejunal ulcer. When a jejunal ulcer occurs in a case of no-loop gastroenterostomy, the proximal loop of jejunum is so short after the segment of the jejunum containing the ulcer has been resected that safe end-to-end anastomosis cannot be done. In such cases, and in cases of gastro-jejuno-colic fistula, this plan of transposing the duodenal stump beneath the mesenteric root to the

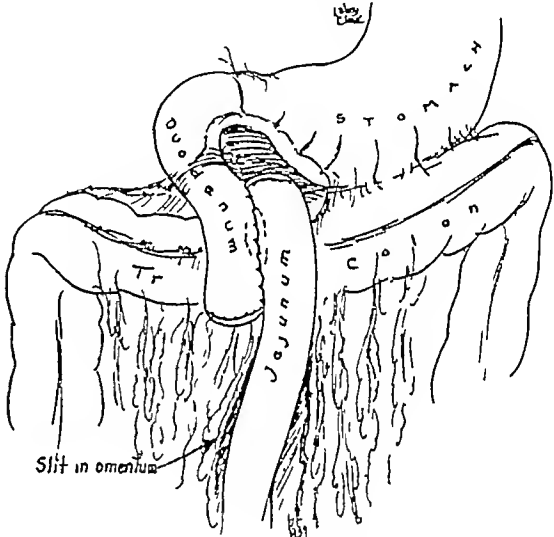


FIGURE 9 Resection of a High Jejunal Tumor

The hepatic flexure has been mobilized and turned down, and the retroperitoneal duodenum and transposed jejunal stump have been visualized and freed. The mobilized duodenum and jejunal stump are brought in front of the transverse colon after the hepatic flexure has been replaced. The lower stump of jejunum, with its end closed, is then brought in front of the transverse colon and a lateral antecolic duodenojejunal anastomosis made. Note that a slit is made in the fat omentum up to the transverse colon to permit the mesentery of the distal jejunal stump to fit into it snugly up to the transverse colon.

about acrimonious disputes between gastroenterologists and surgeons. It resulted undoubtedly in unjustifiable claims as to what could be accomplished by either method. Befogging partisanship undoubtedly produced unjustifiable prejudices which have now been largely overcome by this co-operation, for the benefit of the patient, to say nothing of the consciences of those who must manage them.

DISCUSSION OF PAPERS BY DRs. JONES, BENEDICT ALLEN
AND LAHEY

Dr. PHILEMON E. TRUESDALE, Fall River This has been an interesting and instructive group of papers. We have had presented a beacon light of knowledge in the fields of medicine and surgery. We have had the unusual pleasure of learning of the progress made with the gastroscope, which in the hands of men like Dr. Benedict has proved its diagnostic worth. Then we have listened to a discussion of treatment by leaders in surgery who not only indicated the pitfalls but also pointed out the best known methods for keeping the mortality low and rehabilitation high. The material as presented is evidence of the most advanced thought in dealing with certain types of cases which are often difficult and unpromising, and some times tragic.

My own interest in this subject dates back many years. In 1914 in the *Boston Medical and Surgical Journal* I published a report of 8 cases of pylorotomy for ulcer and quoted Dr. Rodman as having collected 31 cases from the work of five surgeons—Mayo, Robson, Clark, Finney and Rodman. In the latter series, there had been only 1 operative death—a somewhat startling figure.

My first case came entirely by chance. A man about fifty years of age came to the clinic with a history of stomach trouble for years. He had had an attack of abdominal pain and vomiting following a long period of digestive upsets. He had lost 10 to 15 pounds in weight in a few weeks and was quite emaciated. I could feel a mass in the upper abdomen to the right of the midline. The clinical, x-ray and operative diagnoses were cancer of the stomach. I decided to operate in two stages and did

a posterior gastroenterostomy first. After ten days, I removed the pyloric end of the stomach. It was amazing to observe that the inflammatory process which I had believed to be malignant was not more than half the size it was when observed in the first operation. Pathological examination of this specimen showed that it was ulcer not cancer. The man made a very satisfactory convalescence and was more comfortable than any patient on whom we had done a gastroenterostomy.

We did 7 similar operations for ulcer and published all 8 cases in 1914 as mentioned above. There was some doubt as to the extent of the operation being done at that time, and pylorotomy was thought to consist simply in removing the pyloric sphincter muscle or an ulcer that was near the pylorus. The method employed in those operations was a Billroth II now more generally termed "partial gastrectomy." When an ulcer has become cicatrized and fused with the head of the pancreas in a somewhat fixed inflammatory mass, the danger in separating the structures involved is considerable. I have lost 1 patient after an operation in the presence of these conditions, owing to an error of judgment in attempting the radical procedure.

In 91 cases of gastric resection our mortality at the clinic has been 3 per cent. We employ the method of posterior anastomosis. In some countries, as England the anterior operation is practiced. In France, Belgium and Germany the surgeons whom I talked with last autumn were doing posterior anastomoses. There are certain cases, as Dr. Allen has pointed out, which owing to age, local complications and circulatory changes, should not be operated on by any radical procedure.

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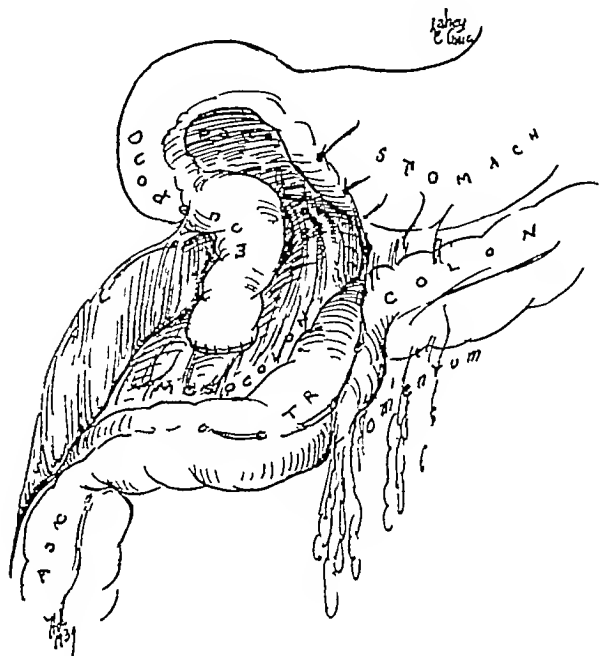


FIGURE 8 *Resection of a High Jejunal Tumor*

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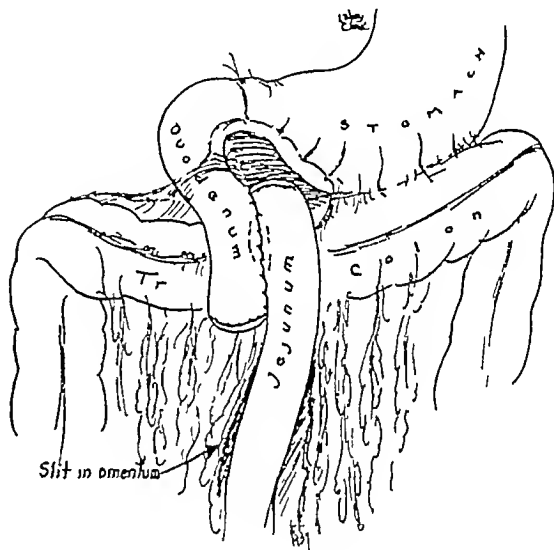


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least, before relapse occurs. Too long or too short courses of treatment, too many or too few shock reactions, discharge too soon after the disappearance of psychotic reactions, may have an untoward influence on the therapeutic result.⁴

Most authors report better results with insulin than with Metrazol in the treatment of schizophrenia, although some remissions have been effected with a combination of the two drugs.⁴ Certain patients who have shown no benefit from insulin have improved when Metrazol was administered, and vice versa. In some cases the production of convulsions, with either insulin or Metrazol, has seemed to be the requisite for improvement.

Continued investigation bears out certain general impressions in regard to criteria to be considered in judging the probability of favorable outcome from shock therapy. These criteria are as follows: the longer the duration of the psychosis before treatment is begun, the lower is the percentage of recovery and improvement, the paranoid and catatonic types respond better, on the whole, than do the hebephrenic and simple types; the personalities which have been comparatively well adjusted, with a minimum of schizoid characteristics, before the onset of the psychosis have the better prognosis. Little has been written stressing the importance of psychotherapy following remission, and it is necessary to keep in mind that resocialization directed toward establishing the most suitable environment for the individual, with its particular limitations in endowment, will be a major factor in withstanding relapse.

Insulin has been found to have little value in the treatment of affective disorders, while Metrazol has produced, at least temporarily, favorable results in a sufficient number of cases of manic depressive and involutional psychosis to merit attention. The literature contains relatively few reports, probably because the prognosis in affective psychoses is so much better than that in schizophrenia that a debatable kind of treatment is less warrantable and needful. Bennett⁶ reports excellent immediate results in a series of 10 cases, of which 6 were depressive psychoses and 4 were severe types of involutional psychosis.

Dangers of Shock Therapy

As the initial enthusiasm about shock therapy has waned, more attention has been given to the dangers involved in such drastic procedure. There have been an increased number of reports on the destructive effects of insulin and Metrazol on brain tissue. In fact, the seriousness of this untoward possibility is not a negligible consideration in attempting to evaluate the soundness of shock therapy. Dislocations of joints, fractures of the long

bones and crushing of vertebrae are admittedly disadvantages that accompany the Metrazol convulsions in a small percentage of cases. Proper nursing surveillance during treatment, and thorough examination before treatment in order to determine the presence or absence of bone disease, may in large part do away with such eventualities. Possible damage to the brain cells cannot, on the other hand, be guarded against with a comparable degree of certainty. A specific number of shock insults to the brain of one patient may result in no appreciable injury, while the same number of comas or convulsions may cause serious and irreparable damage to another. There are no reliable standards by which to judge how much treatment a patient may undergo without injury of serious proportions. Even though the patient may show clinical improvement or recovery following shock therapy, we do not know that future relapses may not be due, at least in part, to the traumatizing effect of the therapy itself.

Experiments with insulin and Metrazol on animals have resulted in injury to the brain cells, and the histopathologic changes have not always been limited to the cortex. Liebert and Weil,⁷ using Metrazol injections with rabbits, found in the autopsied brains shrinking of cytoplasm and nuclei of neurons, and hyperplasia and hypertrophy of different types of glia cells. These findings were more pronounced in the striatum and hippocampus than in the cerebral cortex. The degenerative effect of insulin on the brain cells of animals has been reviewed by Baker.⁸

In examining the brains of 5 schizophrenic patients who died during insulin shock treatment, Ferraro and Jervis⁹ found chromatolysis and glial proliferation in a majority of the cells of the cerebral cortex and proliferation of blood vessel cells, and frequently obliteration of the lumen.

The loss of memory for recently acquired skills and for recent events following Metrazol therapy has been observed by Ziskind and Somerfeld.¹⁰ One patient after twelve convulsions showed a persistent memory defect in that he forgot how to play Chinese checkers and how to keep score in badminton, both recently learned.

From a review of the literature and from a study of hypoglycemia in insulin shock in diabetic patients, hypoglycemia secondary to necrosis or functional overactivity of the islands of Langerhans, insulin shock therapy and experimental hypoglycemia in animals, Baker⁸ concludes "It seems very apparent that continued repeated hypoglycemia may definitely produce a depression of the cerebral function and even an irreversible degeneration of the brain tissue and cells, resulting in

long-continued or permanent functional damage or even death"

"TOTAL PUSH" IN SCHIZOPHRENIA

The problem of schizophrenia in its chronic manifestations has been attacked in another way, less drastic than pharmacological treatment and entirely without danger to the patient. Every psychiatrist knows that there is a tendency to consider that the hospitalized schizophrenic patient will remain sick or get well regardless of treatment, and that time and effort are wasted in attempting to influence the course of the disease. Myerson,¹¹ believing that the deterioration of the schizophrenic patient may be more superficial than it appears, and not necessarily dependent on unfathomable chemical and metabolic changes, devised the method of "total push." This is comprised of common-sense procedures directed toward more individual care for the patient, with the aim of increasing his self-respect and encouraging normal social interests. Particular attention is paid to diet and attractiveness in the service of meals, to clothing,—the old, ward bathrobe being discarded,—to tonsorial service, to exercise, play and other recreations and to psychotherapy.

There is nothing new in the therapeutic formula, except for the perseverance and strenuousness with which it is carried out. No claim is made as regards cure, but in the comparatively small groups in which the treatment has been instituted the incidence of death has decreased, discharges have increased and deterioration has often been replaced by more normal social behavior. Tillotson¹² reports similar results at the McLean Hospital in Belmont, Massachusetts. An interesting point in the "total push" method is that the inertia of the negativistic, resistant patient can often be broken down into voluntary activity by passive muscular movements carried on by the physical trainer.

ELECTROENCEPHALOGRAPHY

The electroencephalogram, an electrical record of the physiological activity of the cortex of the brain, has been proved of unquestionable value in helping to establish a diagnosis of certain organic lesions in the brain. However, the significance of abnormal waves is far from being completely understood. Whether or not abnormalities in the electroencephalogram indicate lesions in the brain, and to what extent physiological disturbance can be present without the presence of a definite lesion, are still to be determined. Recently there have been reports of electroencephalographic studies on psychotic patients. Davis and Davis¹³ have

found that although the electroencephalogram of a psychotic individual may not differ fundamentally in pattern from that of a normal person, as a group the psychotics show in their electroencephalograms a significantly larger percentage of abnormalities than does the normal group. In an investigation being carried on at present, Davis¹⁴ is studying the tracings of a large group of psychotic patients. Her results in patients who received pharmacological shock treatment are of particular interest. If the electroencephalographic patterns of such patients were normal before treatment, they became abnormal during and following its termination. Patterns that were abnormal before treatment remained so, and the abnormalities increased during and after treatment was concluded.

METABOLIC STUDIES IN PSYCHOSES

The theory or belief that psychotic illness is dependent on chemical or metabolic imbalance or dysfunction is given support by the careful and thorough investigations of Gjessing,^{15, 16} in Oslo. During the last thirteen or fourteen years he has studied intensively the metabolism of some 30 patients. Ten of these fell into the group exhibiting clear-cut periodic episodes of excitement or stupor. Gjessing's work shows that in each of these patients the episodes of excitement or stupor synchronize with a consistent rhythmic imbalance in nitrogen metabolism. In some cases it was found that nitrogen gradually accumulated in the body until a certain concentration was reached. At this point excretion began. With the onset of excretion the catatonic stupor or excitement developed. Gjessing points out that it is not the change in motor activity that can account for the change in the nitrogen balance, since in some cases the excitement or stupor did not begin until a day or two after nitrogen had begun to be excreted. In other cases the catatonic episode set in at the end of a period of nitrogen excretion and the stupor or excitement continued during an interval of nitrogen retention. Determinations of the nonprotein nitrogen of the blood also showed rhythmic curves, but in reverse manner to the nitrogen-balance curves.

Gjessing postulates the possibility that at the times of maximum retention or excretion toxic substances are formed which produce the excitement or stupor. He further found that a nitrogen balance could be effected and maintained by the administration of thyroxin. With this accomplished, the periodic episodes of excitement or stupor were prevented from recurring. A patient who had had stuporous phases every month for six or seven years continued month after month without re-

lapse after beginning the thyroid. Gjesing makes no pretension of cure in these selected cases of periodic catatonia, but states simply that a functional deficiency is compensated by the continued use of thyroxin. In some individuals their own thyroid glands seemed to have been influenced, so that relapses did not occur when the thyroid dosage was discontinued.

PSYCHOLOGICAL AND PSYCHOBIOLOGICAL STUDIES

One of the basic principles, and perhaps the most important principle, of present-day psychiatry is that mind and body are not separate. What is called the mind influences and is influenced by bodily reactions. There is no evidence that thoughts or ideas exist independent of physical structure, and their existence is dependent on physiological activity within the body. What might be called a corollary of this principle is that feelings or emotions are not simply ideas but are intimately bound up with bodily, physical reactions, and are responses to stimuli either within the body or within the organism's environment.

Practically, this means that a thought or a combination of ideas may be of enough significance to the individual to result in physiological reactions in various parts of the body. For the doctor, the significance of this is that he frequently sees patients who complain of physiological disturbances which arise, without comprehension on their part, from thoughts, situations, conflicts or frustrations. In some cases such physiological disturbances may eventually result in observable physical disease.

The fact that doctors do not know or fail to remember that emotions can cause physiological disturbance, means that many patients are not going to be given proper treatment. Many physicians still practice as though they thought that if no physical disease is present nothing is wrong with the patient except his imagination.

Considering the consequence of all this, the appearance of the new journal, *Psychosomatic Medicine* is most welcome. It is a quarterly publication, and contains articles on experimental and clinical studies. Up to the present the articles have not been forbiddingly technical. Psychological and physical factors are evaluated in the diseases studied. No prejudice is generally shown in favor of one school of psychiatric interpretation over another.

In a review by Brush¹⁷ of the literature relative to the psychiatric aspects of gastrointestinal disorders, Dr. Chester M. Jones, of the Massachusetts General Hospital, is quoted as saying, "It is of interest that more and more scrutiny is being directed toward the relationship between the central nervous system, the autonomic nervous system and

the digestive tract. The importance of the psyche in its influence on the digestive tract is being more clearly and logically presented." In studying 50 cases of bronchial asthma, McDermott and Cobb¹⁸ found that 37 per cent of the patients seemed to have an emotional component to their asthmatic attacks. Caughey,¹⁹ in a comprehensive analysis of the medical—not psychiatric—literature on cardiovascular occlusion, concludes that "in many patients the symptoms have been precipitated or perpetuated by faulty medical supervision of the difficult problems involved."

Psychosomatic Medicine should make valuable reading for the physician who wants to add to his knowledge of psychological factors in the various disease entities.

Group psychotherapy has been practiced with a good measure of success for many years. One such venture was instituted by Dr. Joseph H. Pratt at the Boston Dispensary, and has continued year after year as a "thought-control" class.²⁰ The milder neurotic reactions have been dealt with in this clinic, principally with the methods of persuasion and suggestion. In 1935 Schilder,²¹ at the Bellevue Hospital in New York City, began group psychotherapy with the more severe neuroses. Psychoanalytical concepts are used. One criticism of psychoanalytical therapy has always been that comparatively few patients can be treated because of the great amount of time required for each analysis. By group therapy Schilder is able to treat a relatively large number of patients, working with seven or eight at a time. An advantage of group therapy is the feeling of security and relief for the individual in finding that he is not alone in having thoughts and impulses which have seemed to him to isolate him from society. During a visit to this clinic it was interesting to observe the freedom with which the patients gave expression to the most personal thoughts and phantasies. Schilder's method of group psychotherapy is described in some detail in his book, *Psychotherapy*.²²

Considering the intricacies and the involved structures often found in the formulations of psychoanalytical theories and concepts of human motivation, it is worthy of note that such comparatively simple conclusions as the following examples came out of certain of Schilder's group discussions:

Human beings should gladly acknowledge their shortcomings. They should be taught neither to overcompensate for them nor to brush them out of consciousness. The ideal of general efficiency and of striving to be blameless is a wrong one. There is no reason to believe that there is only one fundamental problem lying at the base of neuroses. Modern men suffer from the idea that they should be per-

fect. Parents have to pay dearly for every perfectionistic ideal they put into their children's minds.²¹

Such conclusions are found in the common-sense foundations of any good "school" of psychotherapy.

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTE-MORTEM AND POST-MORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26111

PRESENTATION OF CASE

A fifty-six year-old American schoolteacher was admitted complaining of dyspnea on exertion.

Five years before entry on returning from a trip to Europe and while carrying heavy suitcases he had an acute attack of pain over the heart and colon lasting for four hours. After his return home he had a recurrence of this pain and fainted. He was kept in bed for four or five days. Previous to this attack he had had no period of ill health. Up to seven years before entry he had been very active and had had no difficulty in climbing mountains. At this time, however, he noticed some fatigue, and mountain climbing was discontinued. Three years before coming to the hospital his fatigability increased to such an extent that he was unable to walk and was compelled to give up playing the cello. Dyspnea on effort was rather variable and much less at some times than at others. When first seen by his physician four months before admission he was able to walk slowly on level ground. Three months prior to entry he had had a severe attack of breathlessness while attempting to put on automobile tire chains. He was compelled to lie down for relief and almost fainted. There was some pain and swelling of the left lower leg. He had been forced to give up work for a time, but six weeks later he felt better although there was still some pain in the left leg which varied in intensity. The left lower leg and foot were slightly edematous and cyanotic. A month before admission he had had a severe cold and subsequently had recurrent attacks of nausea and vomiting. Dyspnea and fatigue progressed rapidly, but the patient remained in bed for only one day before coming to the hospital. He had been taking varying amounts of digitalis during his entire illness.

Physical examination showed a tall, very thin man with marked arcus senilis. There was considerable cyanosis, with marked engorgement of the veins of the neck. The heart was moderately enlarged. The sounds were regular and of poor quality. A loud click was heard at the apex in mid-diastole. A reduplicated pulmonic second sound was heard in the recumbent position, and there

was a slight basal systolic murmur. The blood pressure was 120 systolic, 90 diastolic. The radial arteries were soft. A few rales were heard at both bases, and the liver edge could be readily palpated. There was slight edema of the ankles. No further details were noted.

The temperature was 98.0°F., the pulse 70, and the respirations 26.

Examination of the urine showed a specific gravity of 1.032, with a large trace of albumin. The sediment contained an occasional white blood cell and red blood cell and many finely granular and hyaline casts. The blood showed a red-cell count of 5,700,000, with a hemoglobin of 95 per cent. The white-cell count was 4800, with 74 per cent polymorphonuclears. An electrocardiogram showed a normal rhythm at a rate of 84, with a PR interval of 0.18 second. There was evidence of right bundle-branch block and low voltage of the QRS complexes. QRS₁ showed the major deflection inverted and T₁ was upright.

Shortly after entry another examination showed diminution in cyanosis and disappearance of the neck vein engorgement and basal rales. Two days after entry cyanosis of the head and extremities became marked and the neck veins were again distended. The liver extended to the umbilicus, and slight sacral edema was noted. The heart sounds were poor in quality and there was gallop rhythm. The symptoms were somewhat relieved by intravenous Mercupurin, and his condition exhibited no great change until early in the morning of the fifth hospital day, when he had an attack of dyspnea and cyanosis, became pulseless and collapsed. The blood pressure was 80 systolic, 30 diastolic. There was no complaint of pain, but the patient appeared to be in shock. He was placed in an oxygen tent and died five hours after the onset of this attack.

DIFFERENTIAL DIAGNOSIS

DR. EDWARD F. BLAND. I am impressed by the prominence of dyspnea throughout this patient's illness, extending over at least five years and possibly seven—dyspnea associated with fatigue. I am uncertain how much reliance we should put on the symptom of fatigue but I am impressed by the dyspnea. The facts that it was somewhat variable, that it sharply limited the patient to the extent that he led an inactive life for a number of years and that it lasted so long impress me considerably. It became more pronounced toward the end at which time there appeared a considerable degree of cyanosis, mentioned several times, and one or two recurring episodes of breathlessness with very little to be found in the lungs to

indicate acute pulmonary congestion. There is probably no single episode mentioned here that could be strictly considered typical of cardiac asthma. In addition to this cyanosis, there were also the prominently swollen neck veins. This venous congestion varied somewhat but remained an outstanding sign associated with another sign of serious heart weakness, namely a gallop rhythm and supporting evidence in the electrocardiogram of strain on the right side of the heart. I think, however, that we should be cautious in reading too much into this electrocardiogram for two reasons: low voltage was present which tends to make an estimation of axis deviation somewhat less reliable, and the presence of intraventricular block of the right bundle-branch type, although often associated with conditions that cause strain primarily on the right side of the heart, is, since it is fundamentally a conduction defect, more often the result of coronary arterial disease.

Furthermore, we cannot quite ignore the attack of severe pain five years before the patient's death, which recurred only once shortly thereafter. However, if this patient's subsequent incapacity represented the effects of slowly progressive coronary disease, and if this original attack of pain represented coronary occlusion, it would be most unusual to have this later limitation of reserve entirely manifested by dyspnea for five years and no anginal symptoms. I suggest that this one and only painful episode may have been due to pulmonary infarction. Throughout the illness, so far as the physical examination is concerned, there is a relative absence of evidence of pulmonary congestion. During this one spell of acute breathlessness, the patient preferred to lie down. That is most unusual with acute pulmonary congestion from left ventricular failure. Finally, toward the end of this patient's illness and at the time of the acute attack of breathlessness, evidence of phlebitis was observed.

It seems to me the differential diagnosis here lies between arteriosclerotic coronary disease and cor pulmonale, the latter secondary to recurring emboli to the lungs. Dr J H Means had a somewhat similar case a number of years ago. There was another, which I happened to have observed on the wards here, that was mistaken clinically for coronary disease, but when we knew the final answer, the heart failure of the right-sided type was entirely explained by recurring showers of small emboli, probably over a period of several years, with relatively few physical signs of such in the lungs.

There is no mention of the Hinton test in the record and no clinical indication of syphilis, there-

fore, I believe we can safely dismiss syphilis without further comment. Furthermore, there is no evidence of valvular disease, and no hypertension. It is difficult, however, to discard completely the idea that there may have been some underlying coronary insufficiency responsible for this patient's heart failure. Yet I am inclined to minimize it, considering the long duration of the symptoms in the absence of anginal pain and pulmonary congestion. The symptom of fatigue disturbs me a little. I cannot quite interpret that, but I see no reason to introduce into the discussion such unlikely possibilities as Simmond's disease or myasthenia gravis.

In conclusion I suspect that this patient had chronic cor pulmonale, with right-sided heart failure probably secondary to recurring small pulmonary emboli, and that he also had a thrombophlebitis in the left leg. Whether he had in addition some underlying coronary disease I should like to leave open, but I doubt if it was a factor of prime importance in his fatal illness. I think it would have been of some help in the differential diagnosis if we knew what the x-ray films showed. The patient lived only five days in the hospital, and I assume he was too sick during this time for such study. They might have given additional information as regards the shape of the pulmonary conus or the appearance of the hilus shadows.

DR HOWARD B SPRAGUE. The hilus shadows were very much increased, and under the fluoroscope there was a question in my mind about pulsation of the hilus shadow, which I think would support your diagnosis.

DR TRACY B MALLORY. Would you care to make any further comment, Dr Sprague?

DR SPRAGUE. Only that I think Dr Bland has done extremely well with this case. I was influenced toward a diagnosis of coronary disease by the history, which went back long before any appearance of phlebitis, and also by the bundle branch block. I think it teaches us that axis deviation and bundle-branch block ought to be considered together, the former may be the early stage of the latter.

DR PAUL D WHITE. How much bundle-branch block was there? Was it of an indeterminate degree? Did it look like coronary disease by the electrocardiogram?

DR SPRAGUE. It was a definite right bundle branch block. Do you think there is a type of bundle-branch block characteristic of coronary disease?

DR WHITE. There are various degrees of bundle

branch block. We ordinarily ascribe duration of the QRS waves beyond 0.12 second—that is, obvious bundle-branch block—to coronary disease.

Dr. SPRAGUE I should say that the QRS wave was wider than 0.12 second, and therefore characteristic of a fully developed bundle-branch block.

Dr. WHITE The extreme cyanosis at the end suggests pulmonary embolism.

Dr. SPRAGUE In the last coronary case of mine autopsied here I made a diagnosis of pulmonary embolism because of the extreme degree of cyanosis in the terminal attack, but no pulmonary embolism was found.

CLINICAL DIAGNOSES

Coronary heart disease (old infarct and possibly a new one)
Right bundle-branch block

Dr. BLAND'S DIAGNOSES

Chronic cor pulmonale.
Right-sided heart failure.
Recurrent pulmonary emboli.
Thrombophlebitis, left leg
Coronary disease?

ANATOMICAL DIAGNOSES

Pulmonary embolism and thrombosis, bilateral, multiple.
Thrombophlebitis, right popliteal
Mural thrombus, right auricular appendage.
Cardiac hypertrophy, arteriosclerotic type
Passive congestion of liver, spleen and kidney
Thrombosis of hemorrhoidal vessels
Arteriosclerosis, moderate, coronary, aortic and pulmonary
Central necrosis of liver
Pleuritis, chronic fibrous, right.
Ascites, slight.

PATHOLOGICAL DISCUSSION

Dr. MALLORY At the time of autopsy we found a markedly dilated right auricle and ventricle, and in spite of this dilatation the right ventricle was thicker than normal, measuring 5 mm. The pulmonary artery was completely filled with thrombotic masses, and with a little investigation it was clear that the thrombus on the left was old, completely organized and evidently had been present for a long period of time, whereas that on the right was quite fresh and represented without much question a terminal episode. There was no infarction of either lung, despite the almost com-

plete occlusion of the pulmonary tree. The coronary arteries were essentially negative.

Dr. BLAND Were the thrombi formed *in situ* or were they secondary?

Dr. MALLORY It is almost impossible to give a definite answer on that. By all odds the most probable thing to my mind, is an embolus followed by retrograde propagation of the clot to form a thrombus which eventually occluded the main artery, the whole process developing so slowly that time was permitted for collateral circulation to develop and prevent infarction.

Dr. J. H. MEANS The case we published with thrombus and occlusion of the pulmonary artery had marked dilatation of the bronchial artery. Was that the case here?

Dr. MALLORY It was not noted.

Dr. WHITE It is possible that right bundle branch block of lesser grades may be ascribed to marked dilatation of the right ventricle, but if so, such cases must be rare. Unless careful dissection is made of the bundle branches we cannot be sure that there is not an associated independent involvement of these branches, even without diffuse coronary sclerosis or the usual larger myocardial infarcts.

CASE 26112

PRESENTATION OF CASE

A fifty-two-year-old Italian janitor was admitted to the hospital complaining of swelling of the abdomen.

The patient had always been strong and healthy until three years before entry. At that time he became troubled with recurrent nosebleeds, which were frequently quite severe and required medical attention. He continued with this work however and was not otherwise troubled until a year and a half prior to admission, when he began to have morning nausea and noted an icteric tint to his skin. He was examined in the Out Patient Department and found to have an enlarged liver. The urine contained bile on this occasion and a blood Hinton test was positive. A Wassermann test of the blood was negative, however and repeated Hinton tests were negative. A year before coming to the hospital the jaundice became more pronounced and swelling of the ankles and abdomen was noted. His appetite became poor and weakness was noted. There was occasional vomiting and frequent frontal headaches. Weakness was progressive, and the patient was compelled to discontinue his work. Six months before entry he became distressed by itching of the legs but his

abdominal swelling became less following medication prescribed by a physician. Subsequently he felt better, but six days preceding entry he developed generalized aches and pains while on a trip in an open automobile. He returned home and had a severe chill lasting for an hour. This was followed by profuse perspiration, fever and increased abdominal girth. Despite these symptoms he went to a picnic and shortly after returning home felt chilly and developed a constant dull aching pain in his abdomen and back. These symptoms were partially relieved by powders administered by a physician, but admission was advised. There were no other symptoms of significance.

The patient had had smallpox at the age of nineteen months and typhoid fever two years later. He had always been a heavy drinker.

Physical examination showed a well-developed but poorly nourished, icteric, man who appeared quite ill. Oral hygiene was very poor, the tongue was dry and the breath fetid. There were impaired resonance, diminished breath sounds and crackling rales at both lung bases posteriorly. The apex of the heart was percussed to 11.5 cm from the midsternal line. The sounds were regular and of good quality, and a systolic murmur was audible at the apex. The blood pressure was 130 systolic, 75 diastolic. Liver dullness extended from the third right interspace to the costal margin, but no edge was felt. The abdomen was tense and distended, and there was shifting dullness in the flanks. Many large dilated subcutaneous veins were noted over the abdomen. There was no edema of the extremities.

The temperature was 100.0°F, the pulse 120, and the respirations 25.

Examination of the urine showed a specific gravity of 1.026, with a moderate amount of bile. The sediment contained 10 white blood cells per high-power field but was otherwise negative. The blood showed a red-cell count of 4,000,000, with a hemoglobin of 70 per cent. The white-cell count was 24,900, with 86 per cent polymorphonuclears. The van den Bergh showed 10.8 mg per 100 cc of bilirubin, with a direct reaction.

On the day following entry an abdominal paracentesis produced 3500 cc of bile-stained fluid with a specific gravity of 1.011 and a total protein of 3.6 gm per 100 cc. A cell count showed 2500 red blood cells and 15,800 white cells per cubic millimeter. Histological study showed lymphocytes predominating with moderate numbers of monocytes and polymorphonuclears, no tumor cells were seen. Following the tap the lower end of

the spleen was palpated. The patient became irrational, and his condition critical. On the third hospital day another abdominal tap produced 3100 cc with similar characteristics to those noted previously. Subsequently his condition became rapidly worse, and he died on the fourth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. HOWARD C. COGGESHALL. The history indicates that liver disease had been present for at least one and a half years prior to entry, because on examination in the Out Patient Department it is stated that his liver was enlarged. Bile was found in the urine, and an icteric tint was noted in the skin. For one and a half years prior to this examination the patient had been well except for recurrent nosebleeds. The past history is apparently negative except for the fact that he was a heavy drinker. Thus far it is apparent that the patient was suffering from some chronic disease of the liver which had been insidiously progressing until admission. One and a half years prior to entry the first evidence of real liver damage appeared, with jaundice, an enlarged liver and nausea. Six months later, definite signs of portal obstruction had developed, as evidenced by the abdominal swelling. He also had edema of the legs, which I assume was secondary to the ascites. He complained of itching of the legs, which could be explained either on the basis of chronic jaundice or subcutaneous edema. He was given some type of medication which reduced the abdominal swelling. This I assume to have been a mercurial diuretic. The terminal episode which brought him to the hospital was some type of intercurrent infection, probably bronchial pneumonia, possibly peritonitis. The results of the examination of the peritoneal fluid were more consistent with the characteristics of a transudate than with those of an exudate as discussed below. This rules out peritonitis, except for the tuberculous and syphilitic types, both of which are said to be occasionally responsible for terminal infections in portal cirrhosis of the liver.

Physical examination at the time of entry showed a fetid breath, crackling rales at both lung bases posteriorly, increased liver dullness, ascites, caput Medusae, a temperature of 100.0°F and a pulse of 120. Laboratory data showed bile in the urine with good ability to concentrate urine to 1.026, and a moderate anemia — 4,000,000 red blood cells, with 70 per cent hemoglobin. There was a marked leukocytosis, with 24,900 leukocytes, 86 per cent of which were polymorphonuclears. A van den Bergh test was distinctly elevated, with 10.8 mg per 100 cc of bilirubin. A paracentesis yielded 3500 cc.

of bile-stained fluid, having a specific gravity of 1.011, with a total protein of 3.6 gm per 100 cc. The leukocyte count on this fluid was slightly elevated, — 15,800 cells per cubic millimeter, — with a predominance of lymphocytes. The interpretation of this fluid is difficult because its specific gravity of 1.011 is inconsistent with a total protein of 3.6 gm per 100 cc. Theoretically, a specific gravity of 1.010 indicates that there is about 1 gm per 100 cc. of total protein present. It is apparent that the specific gravity is either too low or the total protein is too high. In cirrhosis of the liver, the total protein is usually 0.8 to 0.9 gm per 100 cc. and in heart failure, it may range from 0.8 to 4.6 gm. The value of nearly 4 gm in this fluid is distinctly higher than one would expect for ascites secondary to cirrhosis of the liver. One might explain this increase of protein if one were sure that he had had either mercurial diuretics or digitalis immediately prior to entry, because it is known that removal of ascitic and pleural fluids by diuretics will concentrate the protein. About all one can say about this fluid is that it is not the type of fluid usually found with cirrhosis of the liver. There is also evidence of some inflammatory reaction, as shown by the leukocyte count, but this apparently was a sterile fluid, because of the low percentage of polymorphonuclear leukocytes. Such a reaction might be explained by thrombosis of the splenic or mesenteric veins.

The diagnosis of this case has to be made mostly on the basis of the history, which seems to be most consistent with portal cirrhosis. The chief inconsistency with this diagnosis is the presence of jaundice for one and a half years, but from the history it is difficult to be sure whether it was present continuously or intermittently. Ascites rather than jaundice is the commonest symptom of portal cirrhosis. Biliary cirrhosis usually occurs in young people and jaundice is the predominant symptom. There is no history of pain, fever or acute attacks of pain associated with jaundice. One might think of syphilitic cirrhosis, but in spite of the one positive Hinton test the repeated negative tests tend to rule out this possibility. The absence of serological evidence of syphilis does not rule out syphilitic cirrhosis, and in this case the clinical findings are consistent with this diagnosis; however, I do not believe one is justified in making this diagnosis when both the history and physical signs fail to give other evidence of syphilis. The possibility of splenic vein thrombosis should be considered. However the spleen was not palpable at any time except after paracentesis and one would expect a greater degree of anemia. Various types of cancer are ruled out on the basis of the three-year history. There is little to go with a

diagnosis of lymphoma except for the large liver and spleen.

CLINICAL DIAGNOSES

Cirrhosis of liver
Cholemia
Neoplasm?
Hypertensive arteriosclerotic heart disease.

DR. COGGESHALL'S DIAGNOSES

Portal cirrhosis of liver
Hepatomegaly and splenomegaly
Ascites
Bronchopneumonia

ANATOMICAL DIAGNOSES

Cirrhosis of liver probably alcoholic
Peritonitis acute generalized (*Streptococcus haemolyticus*)
Subdiaphragmatic abscess
Esophageal varices
Jaundice
Perisplenitis, acute and chronic.
Ascites.
Pleuritis chronic fibrous.
Arteriosclerosis, aortic and coronary, very slight
Cardiac hypertrophy

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. The diagnosis of cirrhosis of the liver in this patient was fairly obvious and was of course made at the time of his entry on the wards. I am sure, however, that his rapid downhill course — he died within four days — was a great surprise to everyone. There is nothing in the initial physical examination or the note of the visiting man on his first day in the hospital to indicate that he was considered to be in a critical condition. By the next day, however, it was obvious that there must be some important complication. On the wards an acute atrophy of liver superimposed on the chronic cirrhosis was suspected. Dr. Coggeshall seriously considered a mesenteric thrombosis. There was nothing in the history or physical examination to give any precise lead although in retrospect after the autopsy the shaking chill of a few days before looms in imagination.

At postmortem examination a generalized peritonitis was found, from which beta hemolytic streptococci were grown in pure culture. The general peritonitis was evidently of very short duration, probably only one or two days old, but in the left upper quadrant beneath the diaphragm was a large fairly well encapsulated pocket of thick

pus, which must have been present for several days and probably antedated his entrance to the hospital. The rupture of this subdiaphragmatic abscess into the general peritoneal cavity probably occurred subsequent to the abdominal paracenteses.

The liver was normal in size, weighing 1800 gm, but was finely nodular, very firm and fibrotic. It was typical of a chronic alcoholic cirrhosis. The spleen was quite markedly enlarged, weighing 750 gm, and showed a slight diffuse fibrosis. There were well-marked esophageal varices. The heart was slightly hypertrophied, weighing 400 gm, and the coronary arteries showed rare atheromatous plaques, without narrowing of the lumens.

Erratum

In copy editing "Case 26072" (*New Eng J Med* 222:274-276, 1940), certain changes were made in the text which altered the meaning of Dr Michelsen's discussion. The following words, as they appeared in the original copy, should be substituted on page 275:

First column, lines 44 and 45 for "cerebral control of the fibers" substitute "cerebral control and inhibitions"

Second column, line 29 for "such a lesion," substitute "an intramedullary lesion"

Second column, line 31 for "intradural," substitute "intramedullary"

Second column, lines 36 and 37 for "correct, inasmuch as a," substitute "correct. [Paragraph] This objection based upon the history applies to all intradural tumors. A."

The New England Journal of Medicine

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THE VERMONT STATE MEDICAL SOCIETY

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THE HEALTH OF THE NATION

A RECENT interval after the beginning of the new year having been allowed for the discussion of the State of the Nation," we may now turn our attention with propriety to the Health of the Nation." On January 7 the United States Public Health Service released fourteen mimeographed pages having to do largely with vital statistics for the year 1938, in comparison with preceding years and with parts of 1939, and interspersed with comments and quotations. The general tendency toward lower mortality rates continues, the provisional rate for 1938 being 10.6 per 1000 as compared with 11.2 for 1937. The lowest prior mortality rate ever recorded was that of 10.7 for 1933. Typhoid fever, scarlet fever, diphtheria, poliomyelitis, epidemic meningitis, tuberculosis, diseases of pregnancy and childbirth and several other causes showed the lowest death rates on

record. At the same time there is occurring a rapid expansion of public health bureaus and services. The number of counties employing full time health officers reached an all-time high of 1371, while approximately 1500 persons received public health training for positions in official agencies during the year.

Of the many groups that are striving to promote their special interests, the mental hygienists may take great satisfaction and comfort in the statement that Dr. Parran believes that mental and nervous diseases and epilepsy together represent the largest unsolved problem in medicine." There is no lack of recognition of other problems, however, for cancer, venereal disease and "rheumatism,"—there being an estimated total of nearly 7,000,000 cases of the last,—as well as such geriatric diseases as arteriosclerosis, hypertension and heart disease, are recognized as continuing, and often increasing, phenomena among our people. The work of the marine hospitals has increased, less it appears for the merchant seamen than for veterans and patients of the Works Progress Administration.

Current changes in what used to be the primary and picturesque function of the United States Public Health Service are of interest. The quarantine and immigration activities no longer have that salty flavor associated with rope ladders and seagoing doctors. To be sure quarantine officers inspected 15,525 vessels during 1938, but the present commentator will be blown if a lot of it was not done on dry land! It was bad enough when the old steam tugs were replaced by Diesel motored craft at that misty offshore anchorage called quarantine. There is no longer time for a friendly glass in the pilot house before getting on with the business, the ships proceed directly to their docks with nothing more substantial than wireless permission to do so. They call it "radio pratique," but to many an old-time sailor it must seem like going without his breakfast. During the past fiscal year, 1878 airplanes, carrying 25,842 passengers, were inspected.

The glaring item of the report concerns smallpox. If there is any disease for the prevention and eradication of which we have a formula, that

disease is smallpox. Yet its incidence has been increasing in this country for the past ten years. The 14,939 reported cases in 1938 were nearly twice the number represented by the 1933-37 median. Perhaps had Edward Jenner spent his time on syphilis it would have been more effective.

VIGGO CHRISTIANSEN

VIGGO CHRISTIANSEN, founder of Danish neurology and president of the Third International Neurological Congress held in Copenhagen in August, 1939, died in Copenhagen, November 3. Son of an officer in the Danish Navy, he received his medical degree in 1895 and his doctor's degree in 1898. As is usual in Denmark, his final degree was accompanied by the publication of his thesis, *Om Urinens Giftighed specielt hos Sindssyge* (*The Toxicity of Urine, Especially in the Insane*), a volume of 457 pages, Copenhagen, 1898.

He soon was attracted to neurology, then not recognized in Denmark as a specialty, and in 1901 succeeded in forming a small department in the *Kommunehospitalet*. In 1907 he opened a private clinic for patients with neurological diseases. Many years elapsed, however, before neurology became firmly established in Copenhagen, for it was not until long after the World War, in 1929, that a department was set up in the *Rigshospitalet*, with Christiansen in charge. In 1934 he added a department of neurosurgery. Resigning from the hospital in 1938, he was followed by Professor Mogens Fog, as head of the department of neurology. Christiansen was connected with the University of Copenhagen all during his active life.

He was a member of numerous Danish and foreign medical societies, including correspondent membership in the *Académie de Médecin de Paris* and honorary membership in the Royal Society of Medicine of London. He had lectured at the universities of Paris, Strassbourg, Lyon and Reykjavik. Christiansen was an honorary member of the First International Neurological Congress in Berne in 1931 and vice-president of the Second Congress in London in 1933. In addition he had served on the board of editors of many scientific journals

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At the Copenhagen congress one saw an elderly man, cigarette in lips, walking the rotunda of the meeting hall like a fleet commander, small, alert and cordial, but with an air of the navy in both his manner and his gait. A pioneer and a founder of a school, now the center of advanced research, Christiansen will long be remembered in the history of neurology.

MEDICAL EPONYM

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August Bier, then first assistant physician at the surgical clinic of the University of Kiel, first described his use of artificial hyperemia in the treatment of disease in the *Festschrift* (Kiel and Leipzig: Lipsius & Tischer, 1893) in honor of Friedrich von Esmarch's seventieth birthday. This contribution is entitled "Behandlung chirurgischer Tuberkulose der Gliedmaassen mit Stauungshyperämie [The Treatment of Surgical Tuberculosis of the Extremities by Congestive Hyperemia]." The translation of a portion of the article is as follows:

My first experiments with arterial hyperemia were begun in August, 1891, in the following manner. A hole was cut in a simple wooden box large enough so that the tuberculous limb could be placed inside. The extremity was suspended in a sling, the ends of which ran through two holes in the cover of the box and were tied outside so that the limb hung free. The box was heated by means of a spirit lamp like a Quincke's sweat bed, and the air brought to a temperature of 70 to 100°C. The desired effect on the blood circulation was attained in a most satisfactory manner.

R W B

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330 Dartmouth Street
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SEPSIS FOLLOWING POSTPARTUM HEMORRHAGE

Mrs. E. W., a thirty-two-year-old para VIII, entered the hospital January 9, 1934, in labor at term.

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The family history was not obtained. The past history was uneventful except for pneumonia at the age of thirty. She had had five normal full term deliveries and two premature labors. Catamenia were regular, with a twenty-eight-day cycle. The last menstruation had started March 24, 1933, making the expected date of confinement December 31. She had had no antepartum care, but the pregnancy had been normal so far as she knew except for slight swelling of the ankles.

Examination on admission showed a well developed woman, whose color and appearance were good. The temperature was $99.2^{\circ}\text{F}.$, the pulse 108, and the blood pressure 110 systolic, 78 diastolic. The heart sounds were clear and regular, and there were no murmurs. The lungs showed uniform resonance and clear respiration. There was slight edema of the lower extremities. Urine examination was essentially negative. On abdominal palpation the fetal head was located at the fundus, with the small parts on the left. Rectal examination revealed a frank breech presentation and the os two fingers dilated. The fetal heart sounds were clear and regular, the rate being 140. The external pelvic measurements were essentially normal.

Labor progressed slowly after an early rupture of the membranes. During this time the temperature rose to 101.6°F but fell to 98.4 before delivery.

At 8.30 a.m. on January 14 the os was fully dilated. Signs of fetal distress were present in the form of irregularity of the heart sounds. The patient was therefore delivered under full surgical anesthesia, a manual extraction of the breech, converted to a footling, being done without great difficulty. The baby was stillborn and all attempts at resuscitation failed. The placenta was expressed in fifteen minutes, but the uterus reacted poorly in spite of pituitary extract, ergot, massage and ice. The cervix was then exposed and a deep tear found on the left, but as the bleeding was obviously coming from a relaxed fundus, it was deemed advisable not to repair the cervix but to pack the uterus at once. The uterus was therefore tightly packed with a three yard strip, which appeared to control the bleeding. Since the patient's pulse was weak and thready she was transfused with 650 cc. of citrated blood and put to bed in shock position, heaters and blankets being applied. She improved rapidly. The pack was removed the following day, and there was no further hemorrhage.

The temperature, however, rose to 102.4°F within twelve hours after delivery and remained elevated, with occasional intermissions, reaching the maximum of 105.0° on the ninth day. The pulse

varied from 110 to 130. The white-cell count was 16,500 on the fourth day, and 34,000 on the ninth.

A pelvic examination on the ninth day showed the uterus large and slightly tender. The left vault was slightly tender, and the left sided tear of the cervix was plainly felt. The finger was passed through the internal os, and on withdrawal followed by a gush of foul lochia.

The patient was kept in Fowler's position from the second day until the temperature fell to approximately normal. Ice was applied to the fundus, and several courses of fluid extract of ergot by mouth were given.

From the peak of 105.0°F on the ninth day, the temperature fell gradually, but was slightly elevated until the twenty-fifth postpartum day.

The patient was discharged on the twenty-seventh postpartum day. Discharge examination showed the uterus in good position and well involuted, the cervix deeply lacerated on the left side, and no masses or tenderness in the vaginal vaults.

Comment. This case of infection following a postpartum hemorrhage occurred in a multipara whose delivery was complicated by a breech extraction and by uterine packing. It is very difficult to say that the infection was dependent on either of these procedures because the temperature was elevated before delivery. On the other hand, it is not possible to say that infection already existed because of one temperature rise. It is quite likely that the tear of the cervix resulted directly from the breech delivery, properly undertaken but unduly hastened because of the irregular fetal heart. The postpartum hemorrhage was uterine solely as the exposed cervix proved. No cultures were taken from either the uterus or the blood stream, but the chart and history were perfectly characteristic of uterine sepsis. Conservatism was followed throughout, the uterus being left scrupulously alone after the packing had been removed. It must be borne in mind that packing of the uterus is always a potential factor in uterine sepsis, but because of this one should not be deterred from packing in the face of actual hemorrhage. It is better to pack a uterus and treat sepsis than to allow a patient to become exsanguinated.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions of the Medical Postgraduate Extension Courses have been arranged for the week beginning March 17

BERKSHIRE

Thursday March 21 at 4.30 p.m., at the Bishop House of Mercy Hospital Pittsfield. Syphilis in Pregnancy and the Offspring. Instructor Rudolph Jacoby. Harry G. Mellen, Chairman.

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x space in your columns for comment as in certain im-
portant respects the Report does not cover the ground as-
signed to it. The many aspects of the problem may tempt
me to go beyond the limits of a letter, but I shall try to
indicate what I have in mind to say.

The chief but not the only cause of the conditions
which are properly adversely criticized in the Report is
the lack of funds. This explains the Board's neglect in
showing up physicians who have failed to show cer-
tificates of registration to the town clerk. I might give
number of other instances of the difficulties of the Board,
but I shall restrict myself to general considerations.

It has been pointed out to the Board that its income is
derived from fees for examination and registration of ap-
plicant physicians, and that if, after registration, physi-
cians wish any service from the Board, they cannot ex-
pect it unless they pay for it. It may seem to be a new
point of view open to question as to propriety at least,
but this reason has been given as the explanation why
the Board has encountered so much difficulty in getting
appropriations to carry out what it thinks it should do.

It is pertinent at this point to quote from the statute on
requests for increased appropriations in the budget es-
timate. Section 3, Chapter 29 (*General Laws of Massa-
chusetts Tercentenary edition 1932*) reads in part as fol-
lows: "Every officer shall submit to the budget

commissioner estimates of the amounts required
for ordinary maintenance for the ensuing fiscal year,
with an explanation of any increased appropriations re-
commended and with citations of the statutes relating
therein. The said estimates shall not include any es-
timate for any new or special purposes or objects not
authorized by statute." It is easy to think of things
which would improve the usefulness of the office of the
town clerk, such, for example, as a geographical index, a list
of the physicians with their latest addresses, possibly
parade lists of removals, transfers, registrations in other
states, and deaths, but if any project involves the expendi-
ture of money and is not authorized by the statute, it
has no place in the budget.

It appears to me that the Committee is under a grave
misapprehension as to the meaning of "unregistered per-
sons practicing medicine," and in this connection it makes
a statement which is misleading. The Report says
that only does a physician have to register with the
town clerk, but he also has to register with the city or town
clerk. The statute has a different view. It says that
under certain conditions the applicant "shall be regis-
tered" by the Board, and the statute forbids the practice
of medicine by unregistered persons. It says further that
the town clerk "shall record the name of the owner of
each certificate" of registration upon blanks approved by
the Board, and it forbids the practice of medicine until
a certificate has been shown to the town clerk for such
recording. Nowhere in the statute is any person or body
authorized to register any person as a qualified physician
except the Board of Registration in Medicine, and most
of the Report is irrelevant to the purpose for which the
Committee was appointed, because it concerns itself with
physicians who have completed all the requirements for
registration and are truly registered but who failed to have
their names recorded with the town clerk. Their practice
may be illegal but it is not by "unregistered persons."

Perhaps I ought to stop here as there is so little of the
Report left, but it does contain some matter pertinent to
the discussion of matters other than the formal subject
of the study. In the fifth paragraph of the Report, the
Committee says that "it is considering only why so many
unregistered persons are said to be practicing medicine."
If this is all the Committee is considering, — and this is

well within its scope — why put so much else into the
Report? In the fourth paragraph the Committee express-
es itself as having been "compelled to ask why
they [the Board] think that one thousand" unregistered
persons are practicing medicine. If they felt compelled to
ask this question why did they not ask it of the Board
to whom alone, apparently, this thought is attributed? If
they really asked the Board this question are they deal-
ing fairly with the Board and with the Society in suppress-
ing the reply of the Board? The question is purely rhetori-
cal and has not been asked of the Board. The end of the
fourth paragraph is not clear. By implication the Com-
mittee has denied that the condition is as the Board al-
leges, and it then attempts to explain the cause of this
alleged condition the existence of which it has denied.
If the Committee had acknowledged that there is some
truth in the claim of the Board and had tried to explain
the situation as it is and not as it is alleged to be, the
argument might have been more impressive.

In the same paragraph occurs the following sentence
"Such conditions if true, not only reflect seriously on the
whole medical situation, but also on the Board it-
self." It is a fact that the whole medical situation, on
which reflection may properly be made, is more serious
than is generally recognized even by physicians. What,
indeed is the significance of the well-known fact that
what may be called perhaps, the most important piece
of medical legislation since the creation of the Board in
1894 namely the creation of the Approving Authority re-
sulted from a bill which was introduced not only without
the support of the Society but in direct opposition to the
advice of its officers?

Three other sentences in the fourth paragraph need
comment. The first reads "the Board which has
had the responsibility for forty-five years of protecting the
public against unregistered persons practicing medicine

"In justice to the Board, the extent of the responsi-
bility should be stated clearly and a recent case shows
how limited the responsibility actually is. It is important
to remember that responsibility is limited by the power
to do something. To what action is the Board then
limited? It was reported to the Board that a certain per-
son was practicing medicine without a license. In ac-
cordance with the statute, this was further reported by
the Board to the proper prosecuting authorities, the police,
and the responsibility of the Board stopped there, under
the statute. The matter was investigated there was Grand
Jury indictment, and the case was disposed of favorably to
the defendant without giving a single witness or the in-
vestigating the opportunity to appear in court. For the
Committee to say that the Board has the responsibility
(italics mine) is to speak without knowledge.

The Report says that the Committee asks why the
Board thinks men are practicing on dead men's certi-
ficates. I have never heard from the Board that it thinks
so. The Board has claimed that this may be so, and that
it was so in one instance in the past was shown by find-
ing after a physician had died that he had been practic-
ing on the license of another physician long since
dead. There may be other cases and it has been reported
to be the experience of other states, when the annual
registration law went into effect, to find several instances
of this unauthorized practice.

The reason why the Board thinks there are probably
a thousand persons, not registered by the Board, who are
practicing in Massachusetts, is that a comparison was
made with the state of New York where there was an
estimate from the experience in comparing carefully certain
selected areas as samples, and a count of persons who ac-

ually left the state when annual registration became effective. The resulting figure for Massachusetts on the basis of the relative number of physicians in the two states was about 1300. The Board has said 1000, a conservative estimate. All such figures are merely estimates, but support for the figure "1000" is given by the estimated number of chiropractors practicing chiefly under license to give massage, of physiotherapists who practice not under the direction of a physician, of persons practicing by the use of electrolysis (38 persons or organizations are listed in a recent telephone directory), of skin "specialists," of arch support prescribers, and the large number of "little" persons who peddle or prescribe their own little remedies. Perhaps this last group is the largest of all. Another sidelight on this question is thrown by the statute, in its list of groups of unregistered persons practicing medicine who are exempt from the penalty for violating the medical practice act. The very fact that they are listed as exempt means that in the eyes of the statute they are practicing medicine. I think it is a conservative estimate to place the figure at 1000 unregistered practitioners of medicine in Massachusetts. As most of the complaints about the practice of medicine by unregistered persons seem to be reported to the police before they come to the attention of the Board, I have directed inquiry to this quarter and the reply is that 1000 is a *very* conservative estimate.

Before I conclude I must say one word about the quotation from what the secretary of the Board is reported to have said in 1937. I do not recall the exact words I used on that occasion, — and when one speaks extemporaneously words have a strange way of slipping, — but I do not see how I could have said what was attributed to me, because I know I have never held all the views there expressed as mine. It is a fact, and contrary to the statement in the quotation, that the prime duty of the Board is to protect the public against physicians, against unqualified persons by refusing to admit to practice such as the Board finds unqualified, and by removing from practice persons whom it has licensed and who in its opinion have shown serious disqualification in practice.

In closing, I may say that my chief criticism of the Report of the Committee is that it has missed the mark. It might have limited itself to "unregistered persons practicing medicine," the formal restriction of its scope. But as to what registration means, it does not see eye to eye with the statute, the authority of which in this connection exceeds that of the dictionary. Or it might have transcended the mere title, if it had had the vision to see that control of unregistered persons is by necessary implication only a part of the whole problem of the regulation of the practice of medicine, and have discussed what it thought pertinent from this higher point of view. How defective the law and the procedure are, I suppose the Board of Registration in Medicine knows better than anyone else.

Now a really mature medical practice act, which is what the Committee might well have discussed if it once saw fit to go outside the narrow scope of its title, should contain three general provisions, with many details of course. There should be first a definition of what is to be regulated, that is, a definition of the practice of medicine. Without this the law cannot be well enforced. If no one knows what the practice of medicine is, it cannot be defined. If everybody knows, the definition should not be beyond the power of man to put in words. There should be next a statement as to who may practice, and all the qualifications therefor, and how they should be determined, and the regulations under which practice should be carried on, with penalties for violations, that is, penalties against unpermitted practice. There should be last a

procedure for stopping the practice of persons once found qualified, but later deemed to be unqualified.

For the last procedure, the statute has, since 1894, made fairly adequate provision. The second is still inadequate, although it is hoped that the Approving Authority may be a means of approaching a reasonable degree of adequacy. Annual registration is a mere detail. Massachusetts has always neglected the first provision and it remains almost the only state that fails in this respect.

No one who has not been closely connected with the work of the Board has any idea of the amount of work that is involved or of the difficulties under which it is carried on, yet its importance in protecting the health of the public is out of all proportion to the size of the budget. It is to be hoped that this conscientious and stimulating Report of the Committee will not merely direct the attention of the Society to the work of the Board, but will result in improving the conditions under which the Board is trying to protect the public against the improper practice of medicine.

STEPHEN RUSHMORE, M.D., *Secretary*,
Board of Registration in Medicine.

RESTORATION OF LICENSE

To the Editor This is to inform you that in accordance with the vote of the Board of Registration in Medicine, the license of Dr. William M. Walsh, 32 Edison Green, Dorchester, revoked on April 1, 1937, was restored on February 29, 1940.

STEPHEN RUSHMORE, M.D., *Secretary*

State House,
Boston

NOTICES

BOSTON DOCTORS' SYMPHONY ORCHESTRA



The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concert master with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every Thursday at 8 30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr. Julius Laman, Pelham Hall Hotel, Brookline (BEA 2430).

BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library, 8 Fenway, Boston, on Monday evening, March 18, at 8 15. Dr. Hyman Morrison will give an illustrated talk on "Early Chapters in a Life of Reginald Heber Fitz."

All interested persons are cordially invited to attend.

BOSTON HEALTH LEAGUE

The annual meeting of the Boston Health League will be held at The Sheraton, 91 Bay State Road, Boston, on Tuesday, March 19, at 12 30 o'clock. Dr. Clifton T. Perkins, Commissioner of Mental Health, will speak, his sub-

yet being "Present Activities of the Massachusetts Department of Mental Health."

Reservations for luncheon, \$1 a plate, should be made at the office of the Boston Health League, 80 Federal Street, before March 16 (LIB 8515)

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday March 20 from 2 to 4 p.m. Drs. Elliott C. Cutler and Soma Weiss will speak on "Anemia."

Physicians and students are cordially invited to attend.

CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held in Carney Hospital Auditorium on Monday morning, March 25, at 11.30

PROGRAM

Recent Advances in Stomach Surgery Dr. Joseph Stanton.

Unstabilized Lumbosacral Joints End results of 250 lumbosacral fusions. Dr. Thomas F. Broderick.

Boce Tumors. Dr. Michael E. McGarty

Physicians and medical students are cordially invited to attend.

GEORGE W. GAY LECTURE

The George W. Gay Lecture on Medical Ethics will be given on Tuesday March 19 at 5:00 p.m. in Amphitheater E of the Harvard Medical School. Mr. Phillips Ketchum, of Boston will speak on the subject "How Does a Doctor Spend His Money?"

TUFTS COLLEGE MEDICAL SCHOOL ALUMNI ASSOCIATION

The annual meeting and dinner of the Tufts College Medical School Alumni Association will be held Wednesday evening March 27 at the Hotel Somerset, Boston at 7.00. A short business meeting at 6.30 will precede the dinner.

Dr. Timothy J. Leary will introduce Professor Alan R. Montz, who will speak on "Tales that Dead Men Tell." The cost of the dinner including dues will be \$3.50

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The New England Society of Physical Medicine will meet at the New England Sanatorium and Hospital Melrose, on Wednesday evening, March 20. Following a dinner at 6.30 the program will be presented in the gymnasium, at 7.15

PROGRAM

Principles of Hydrotherapy Dr. C. A. Haysmer
Practical Application of Hydrotherapy Including Hubbard Tank, Whirlpool Bath and Nauheim Bath in New Unit. Dr. W. A. Ruble.

All members of the medical profession are cordially invited to attend the meeting.

NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held on Friday March 29 at 8:00 p.m. at the Peter Bent Brigham Hospital.

PROGRAM

Forensic Pathology Dr. Alan R. Montz.
Business meeting.

Physicians and students are cordially invited to attend

AMERICAN HEART ASSOCIATION

The Sixteenth Scientific Sessions of the American Heart Association will be held at the Hotel Roosevelt New York City on Friday and Saturday June 7 and 8

The general cardiac program will be given on Friday and the program of the section for the study of the peripheral circulation on Saturday

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY MARCH 17

SUNDAY MARCH 17

4 p.m. Doctor Will My Baby Be Normal? Dr. Charles P. Sheldon. Illustrated, public, health lecture. Faulkner Hospital Auditorium.

MONDAY MARCH 18

8.15 p.m. Early Chapters in a Life of Reginald Heber Fitz. Dr. Hyman Morrison. Boston Medical History Club. Boston Medical Library 8 Ferry

TUESDAY MARCH 19

9-10 a.m. Clinicopathological conference. Dr. D. S. King. Joseph H. Pratt Diagnostic Hospital.

12 m. The Clinical Significance of the Collateral Circulation in Patients with Angina Pectoris. Dr. Herman Blomgart. South End Medical Club. Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue, Boston

12.30 p.m. Present Activities of the Massachusetts Department of Mental Health. Dr. Clifford T. Perkins. Boston Health League. The Sheraton, 91 Bay State Road, Boston

5 p.m. How Does a Doctor Spend His Money? Mr. Phillips Ketchum. George W. Gay Lecture on Medical Ethics. Harvard Medical School Amphitheater E.

WEDNESDAY MARCH 20

9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

2-4 p.m. Anemia. Drs. Elliott C. Cutler and Soma Weiss. Peter Bent Brigham Hospital

THURSDAY MARCH 21

9-10 a.m. Control of Gonococcal Infection. Dr. O. F. Cox. Joseph H. Pratt Diagnostic Hospital

FRIDAY MARCH 22

9-10 a.m. Psychotherapy. Dr. Donald MacPheron. Joseph H. Pratt Diagnostic Hospital

SATURDAY MARCH 23

9-10 a.m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital

*Open to the medical profession.

MARCH 15—Staff Meeting. United States Marine Hospital. Page 422, issue of March 7

MARCH 20—New England Society of Physical Medicine. Notice above.

MARCH 25—Monthly clinical meeting and luncheon. Carney Hospital. Notice above.

MARCH 27—Tufts College Medical School Alumni Association. Notice above.

MARCH 29—New England Pathological Society. Notice above.

A. S. 11—Peabody Association of Physicians. 8.30 p.m., Hotel Marlborough

A. S. 15-17—American Association for the Study of Golfer. Page 203, issue of February 1

A. S. 15-19—New England Health Institute. Page 784 issue of February 15.

APRIL 24—Massachusetts Dental Society. Page 363 issue of February 7

APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.

MAY 10-13—American Scientific Congress. Page 1043 issue of December 23.

MAY 15—United States Pharmacopoeial Convention. Page 202, issue of February 1

JUNE 7-8 — American Heart Association. Notice above
 JUNE 7-9 — American Board of Obstetrics and Gynecology Page 1019, issue of June 15
 JUNE 8 and 10 — American Board of Ophthalmology Page 719 issue of November 2
 JUNE 10-14 — American Physicians Art Association Page 332 issue of February 22
 OCTOBER 21 — American Board of Internal Medicine Inc Page 369 issue of February 29

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

APRIL 3 — Page 422 issue of March 7
 MAY 8 — Annual meeting Salem Country Club Peabody

FRANALIN

MAY 14 — Franklin County Hospital Greenfield

HAMPSHIRE

MAY 8 at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MARCH 20
 MAY 15
 Meetings are held at 12 15 p.m. at the Unicorn Country Club Stoughton.

MIDDLESEX NORTH

APRIL 24
 JULY 31
 OCTOBER 30

NORFOLK SOUTH

APRIL 4
 MAY 2.
 All meetings with the exception of one which is usually held at the Quincy City Hospital are held at the Norfolk County Hospital in South Braintree at 12 o'clock noon.

PLYMOUTH

MARCH 21 — Goddard Hospital Brockton.
 APRIL 18 — State Farm
 MAY 16 — Lakeville Sanatorium Lakeville.

SUFFOLK

MARCH 27 — Scientific meeting Symposium on Ulcerative Colitis and Diarrhea. Under the direction of Dr. Chester M. Jones
 APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers. Program and speakers to be announced later
 MAY 2 — Censors meeting Page 244 issue of February 8

WORCESTER

APRIL 10 — Worcester Hahnemann Hospital
 MAY 8 — Worcester Country Club
 Each meeting begins with a dinner at 6 30 p.m. and is followed by a business and scientific meeting

BOOK REVIEWS

Cancer of the Larynx Chevalier Jackson and Chevalier L. Jackson 309 pp. Philadelphia and London W. B. Saunders Co., 1939 \$8.00

With the constant expansion of medical knowledge, such specialized subjects as cancer of the larynx now pass from simple inclusion in textbooks to the importance of the monograph. When the authors bring to their book the wide knowledge and clinical experience of the Jacksons, father and son, one may expect a most comprehensive consideration of the subject.

The arrangement of this book is most satisfactory in its clear-cut segregation of the many aspects involved in a discussion of cancer of the larynx. The early chapters deal only with the technical procedures incident to the diagnosis of the lesion by mirror examination and biopsy by direct laryngoscopy. Then follow descriptions of the procedures of laryngofissure and laryngectomy, exhaustively described and freely illustrated with both line drawings and colored plates by the authors. No effort is spared to

make clear the minute steps in operative technique. Full consideration is given to the therapeutic use of x-rays and radium, as well as to palliative measures in inoperable conditions. In a second major division, attention is directed to exceptional cases, rare types of laryngeal growth, borderline and precancerous conditions, etiology, prophylaxis, general considerations and controversial phases of the subject. Free use has been made of photomicrographs and of colored illustrations of the actual picture seen at mirror laryngoscopy. The segregation of the first part of the book into two parts clearly avoids the confusion which might result from an attempt to discuss operative technique and clinical considerations in combination.

The final third of the book presents a historical and chronological picture of the development of laryngeal surgery, with brief accounts of the work of the many pioneers who have contributed to the present status of our knowledge of laryngeal cancer. An extensive bibliography makes available almost all the literature pertinent to the subject.

As a whole there is presented an exhaustive account of the pathology of laryngeal cancer, the methods available for its diagnosis and, in satisfying detail, the operative and non-operative maneuvers now appropriate for its eradication and cure.

The Neurogenic Bladder Frederick C. McLellan. 206 pp. Springfield, Illinois, and Baltimore Charles C. Thomas, 1939 \$4.00

This book purports to be a study of the alterations in function of the urinary bladder resulting from various forms of disease or lesions of the spinal cord and brain, as determined by the cystometrogram.

It is very loosely written and therefore very disappointing, coming as it does from one of the outstanding teaching clinics. For instance, in each of the first three illustrations, which are copied from the literature, either the name of the authority is misspelled or the title of the communication misquoted. Even worse than this is the writer's diction, which in many places is so clouded as to leave the reader in complete darkness as to its meaning. The third sentence of the book reads "This organ has a sensory distribution which parallels roughly that of the skin." He means "the bladder," though this has not yet been mentioned, and that it is supplied by "sensory nerves." Or again (page 64) "Progressive advance of supranuclear lesions involving the nuclear [sic] of infranuclear areas will produce this bladder." Certainly a new way of producing a bladder! Still further (page 101) "In view of the high incidence of both spina bifida occulta and enuresis, there certainly would be no great odds for coincidence in this situation."

In short then, in its present form this publication entirely fails to carry conviction. Some forty-nine charts are published supposed to illustrate the various sorts of deviations from the normal shown by the cystometer. One cannot avoid the thought, in view of what has preceded them, that these two have been so inaccurately assembled as to be of little value.

Medical Record Visiting List or Physicians' Diary for 1940 Revised. Baltimore William Wood & Co., 1939 \$2.00.

This pocket size visiting list is made in three sizes, for thirty, sixty or ninety patients a week. The record is preceded by twenty-seven pages of dosage tables, poison antidotes and like material.

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MEDICAL EDUCATION

A. LAWRENCE LOWELL

BOSTON

HAVING been asked to write out for the *New England Journal of Medicine* some informal remarks which I made last June at the Harvard Medical School to the Class of 1914 on the twenty-fifth anniversary of its graduation, I send these pages. The excuse for the remarks was that 'old men plant trees,' which means that as they can not expect to see the fruition of plans they propose, or ideas they suggest, they are free to dream about them. In this spirit I made the observations to the class, the substance of which I repeat here as well as I can.

Education in medicine is more difficult than that in any other profession, because it involves the knowledge of many subjects which, apart from their relation to medicine, have no natural connection. In a school of law or engineering, for example, the various topics studied are either different phases of the same general subject, or, like mathematics in engineering, a tool for the solution of its problems. In a medical curriculum, on the contrary, gross anatomy has to the beginner no obvious connection as a tool or otherwise with biological chemistry, bacteriology or pharmacology. Each involves a brute effort of memory without much help from educational mnemonics, and is largely forgotten before the time comes for its application to the practice of medicine or surgery. The student learns anatomy and forgets much of it, physiology and forgets much of it, and so on throughout his course.

I recall the remark of a professor in a special field, that he always described in a lecture to his class a very rare disease of which he felt that his students ought to have heard, although he knew they would remember nothing about it. Perhaps the result was merely confusion in the less perceptive members of the class, rather than a clearer conception of the general aspects of medicine. Whether there is an advantage in learning more facts than can be retained depends upon

the nature of those facts and their effect upon the mind. When fresh illustrations of a thought or action tend to produce familiarity with the idea or process, and thus render it more easily and better reproduced it is well. This is true of making a diagnosis or watching an operation, but it is not true of striving to memorize more discrete facts than the ordinary human mind can retain and utilize, and every physician knows that medical knowledge has far passed that point today. Therefore it should be more and more recognized as having done so, and selection of basic topics ought frankly to replace the attempt at omniscience. No doubt this has been done to a large extent, but the outside observer feels that it ought to be done with greater system.

No other professional education attempts to cover so large a part of its possible field of knowledge for its students, nor could it do so without obliging them to spend the better part of their lives in learning many specific things that they will never use. In former times the physician was expected to make a diagnosis on his first visit to the bedside, on peril of being thought ignorant if he failed to do so, but that has long passed, and in any complex case he takes blood and cultures, reserving his final opinion until these have been examined in the laboratory.

There is, in fact, a very real disadvantage in the present length of medical education, and that is the late age at which physicians and surgeons are able to begin active practice. The course at most first-class medical schools is now four years, followed by an average of about two years in a hospital, and longer with those most ambitious to perfect themselves. If a man goes through a college, he spends nearly two years of it in pre-medical studies, entering college at an average age of eighteen years and three months, thus graduating at twenty-two years and three months. That means that he gets through the medical school and

hospital not earlier than twenty-six—far older than a man ought to be when he begins his work in life, and in most cases too near the end of the age of greatest intellectual fertility

At the other end of his career, if he has an appointment of service in a hospital he loses it, as a rule, at sixty-two, and very commonly his private practice therewith. Some years ago one of our clinical professors retired from the hospital at the regular age, and also from the medical school because he had lost his clinic. His former students and colleagues gave him a dinner which received much publicity, and produced the impression that he was bidding farewell to medicine whereat he lost the private practice he had hoped to continue. A little later a colleague, on retiring, was offered a complimentary banquet, but prudently declined it. Perhaps the age of retirement is too early or too late—too early if it means withdrawing from the community the benefit of his experience, too late if it means turning over to his juniors the bulk of the work at the hospital, while retaining some supervision and a sufficient teaching clinic.

As things stand, the man with a permanent hospital appointment—out of a useful life which could last, let us say, on the average until seventy—has a maximum of some thirty-six years for acquiring and conducting a practice, to which he has devoted, including the two premedical years, a minimum of eight to professional training. That seems disproportionate, and, what is more, the length of training has been increasing, and the age of hospital retirement becoming lower, until the outside scoffer wonders how soon the time to leave will arrive before the preparation for appointment is complete.

It is curious to compare the position of the clinical with that of the laboratory teacher. The latter may be appointed to a position of some sort in the medical school at any period after graduation therefrom, if he shows ability, and may hold his place as late in life as the general policy of the university permits. More depends upon the progress and the value of the man, less upon dates and periods.

Now let us look at these facts, beginning with the college. In the last half-century the age of entering Harvard, and no doubt other colleges, has been reduced almost exactly one year from nineteen and three months to eighteen and three months. Personally, I should like to see it fall six months more, for I think reasonably intelligent young men are perfectly capable of excellent intellectual development at that period of life. I

should much regret to have the students of our best medical schools lose the benefit of contact with other young men in a college of liberal arts the more so because I now lament the withdrawal, as compared with former times, of the medical profession from civic affairs to which they could contribute so much.

In regard to the next stage, that of the medical school, one who has had a chance to see it only from the faculty table must speak with great diffidence, and yet he may get some impressions not wholly without value because detached from the interest of teachers in their specific fields. That interest was in earlier days truly formidable. One sees it in the planning of the present Harvard Medical School, with its four separate and distinct establishments for the four chief laboratory subjects, each capable of containing an entire class, with its big lecture room unused three-quarters of the time. The impression is that those who planned the school intended to exclude from anatomy and from physiology, for example, any infiltration of the other as something alien to its nature. The old conception was the attainment of medical knowledge by study of many distinct and separate fields, that of the present, is correlating those fields into one great subject of medicine as a coherent whole, and to do this by an even more rapid process seems not impossible.

One sees the old conception again in the former attitude of the laboratory and clinical professors toward each other. They sat on opposite sides of the faculty table, and if an additional appointment were made to one group it was expected by the other also, that the balance might be maintained. It was like the days before the Civil War, when if a free state was admitted to the Union a slave state must come in to match it. Such an attitude in the medical school is inconceivable to-day. The clinic makes constant use of a laboratory, and the laboratory teacher appreciates more fully that his ultimate aim is fitting men for practice.

The interest of the medical teacher in his specific field as something distinct and separable from medicine as a whole has been greatly reduced partly by a better recognition of the interrelation of all scientific knowledge which has broken down artificial distinctions, partly in the Harvard Medical School by the general examination for graduation which has caused both student and teacher to correlate laboratory and clinical knowledge in a striking way. It is strange that this highly effective device has been little copied in other medical schools, for people still regard examinations mainly as a test of work done, whereas their most

important function is setting a standard of accomplishment.

Notwithstanding the advances made, there does seem to be still some needless attempt to cover too much ground, and it is possible that by a better correlation of structure and function, of laboratory and clinic, some forgetfulness could be saved, and to forget means waste of time in medical education. Failure to remember much that has been learned is inevitable, but oblivion due to needless lack of foresight in the sequence of the subjects taught is clearly to be avoided in a school of medicine. It means the loss of time, and time—that is, the length of the period required for professional training—is a vital matter in medical education today.

For a non professional observer to attempt to tell experts how to improve their methods would be presumptuous and provoke derision, but he may properly observe that the results are in some re-

spects defective from the standpoint of the community and of the profession. He may point out defects and suggest that they take them into consideration.

Vast improvements in medical education have been made in the last half-century, but in making them there seems to have been a tendency to add the new to the old without sufficient effort to eliminate some things no longer needed, to consolidate and simplify the curriculum—including the hospital part thereof—to make it more consistent, easier to grasp as a whole. All honor, nevertheless, to the men who have brought it to the present state. In view of the enormous increase in medical knowledge they have done wonders, but they would be the last to claim, or to hold, that they had reached perfection or, in the words of our own Oliver Wendell Holmes, that the time has come to expect that Heaven declare its final dividend.

ALTERNATING TREMOR (PARALYSIS AGITANS) AND ATHETOSIS*

Recent Advances in Diagnosis and Treatment

TRACY J. PUTNAM, M.D.†

NEW YORK CITY

THERE is a natural tendency to suppose that obscure conditions the symptoms of which display some similarities are due to similar disease processes. Doubtless for this reason, it has been the custom to group together Parkinson's disease, postencephalitic tremor, Sydenham's chorea, cerebellar tremor, Huntington's chorea, athetosis, dystonia and other entities. Formerly even the tremor of Graves' disease was often included. From this group I shall attempt to pick out and reassemble two categories, which appear to be well defined physiologically, and which are ordinarily due to a limited number of disease processes. These two may be denominated as alternating tremor and athetosis.

ALTERNATING TREMOR

The most familiar example of alternating tremor or is paralysis agitans of the elderly, which, as we all know, was described by James Parkinson¹ in 1817. His clinical description, easily available in reprinted form, has scarcely been equaled since. He noticed the persistence of tremor in certain

groups of muscles, its rhythmic, alternating quality, the fact that it may disappear during voluntary activity (or rarely be exaggerated) and the rigidity and weakness which accompany it. The pathological basis of the disease is now recognized to be an arteriosclerotic atrophy of the globus pallidus and substantia nigra.² This is often associated with scattered lesions throughout the nervous system, which are doubtless responsible for the mild defects of the pyramidal system and consequent paresis of voluntary motion often found, and also for general cortical atrophy and intellectual enfeeblement, either of which may or may not coexist.

Since the pandemic of encephalitis of 1918-1925, juvenile forms of the same physiologic disturbance have become almost commoner than the senile form. At first, a history of encephalitis was usually obtainable from the former group of patients, but in the presenile cases in which the onset has taken place in recent years, such a history is the exception rather than the rule. There seems to be a tendency for the senile and presenile groups to merge, so that now the commonest decade for onset is the fifth.³

A similar syndrome is rarely seen following head

*Read at the annual meeting of the New Hampshire Medical Society, Manchester, June 7, 1939. From the Neurological Unit, Boston City Hospital, and the Department of Neurology, Harvard Medical School.
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injuries in young people, more rarely still as a result of multiple sclerosis, chorea and a scatter of other etiologic entities

Clinical Manifestations

The diagnosis is unmistakable in typical cases, which all physicians have seen. A few signs are to be watched for in doubtful cases. To be included in this category the tremor must affect chiefly the distal portion of the affected extremities, and have a regular rate of 5 to 8 per second, varying scarcely at all from day to day or from limb to limb.

Early signs are a loss of the normal swinging of the arms in walking, immobility of the face and eyes, failure to move the feet under the center of gravity in rising from a chair and inability to cross the legs in sitting. If the patient is asked to wink rapidly, the eyelids tend to lag after one or two closures. If the forehead is tapped with a hammer, the eyelids tend to go into spasm. As the patient attempts to touch his forefinger with his thumb repeatedly and rapidly, the two digits seem to "freeze" together. In contrast to this disability, the patient easily catches a ball or a roll of paper which is thrown to him, tosses it back and again becomes immobile.⁴

Special Physiological Studies

With special recording devices, the best of which is the electromyograph, the following additional points may be made out: as the flexors contract, the extensors relax completely, and vice versa. The bursts of contraction appear simultaneously in many of the motor units (groups of muscle fibers innervated by a single anterior horn cell). This is unlike normal voluntary movement, which is sustained by a series of overlapping asynchronous discharges of motor units. Rigidity when present is produced by a simultaneous innervation of protagonist and antagonist muscles.⁵

Medical Treatment

None of the ordinary disease processes underlying the syndrome just described are susceptible of successful treatment. At present, our only resource is to attack the physiologic disturbance rather than its cause. The same types of remedy are therefore applicable to all the clinical varieties of alternating tremor, but the amount of success that they promise is inversely proportional to the extent of the lesions and to the patient's age.

The standard treatment of paralysis agitans of all types is the use of drugs of the hyoscin series (Charcot,⁶ 1867). They should always be tried, though the results are often disappointing. Convenient forms are the 2½-gr pills of stramonium

leaves or the ordinary 1/100-gr hyoscin tablets. Either may be used three times a day, and rather rapidly pushed until the patient develops toxic symptoms. Recently a "wine of Bulgarian bella donna" (not yet on the market) has been given extensive trial, it is of questionable advantage over older forms, but may be tried if they fail. The dose is 5 drops after each meal, increased by 5 drops a day to the point of tolerance.⁷ The capacity of patients with paralysis agitans for drugs of this series is sometimes enormous, one of my patients took 1/3 gr of hyoscin daily over several days. The unpleasant symptoms may often be mitigated by giving pilocarpine, 1/8 gr three times a day by mouth.

The effect of drugs of the atropine series is sometimes increased by the use of amphetamine (Benzedrine sulfate) by mouth, in doses of 10 mg or more. This is particularly effective against the tics, such as oculogyric crises, that often complicate the postencephalitic type of the syndrome. Patients also tend to feel stronger and more alert when taking amphetamine. It is seldom effective in the senile group.⁸

Other drugs are on trial. Certain modifications of atropin and synthetics have been recommended.⁹ In the experience of our clinic, they are seldom more effective than the official drugs. Curare has been injected with promising results, but is too cumbersome and dangerous for routine use at present. Alcohol in the form of ordinary liquors is a great relief to some patients, and the barbiturates (except phenobarbital¹⁰) are worth trying.

Exercises and psychotherapy have been recommended, but are seldom of decisive value.

Surgical Treatment

In some cases of alternating tremor, of whatever origin, the situation is sufficiently distressing to warrant surgical intervention. Success has been reported from operations of two general types: resection of the motor¹¹ or premotor¹² cortex, and section of the pyramidal tract.¹³ As regards the tremor, the result is often striking: it is abolished or reduced to an insignificant remnant. The more extensive cortical operations produce a severe monoplegia, however. It is still uncertain whether favorable results can be obtained by removal of more restricted areas, with less disability. Section of the lateral pyramidal tract in the cord is followed by less disturbance in the use of the hand, but the leg is also rendered somewhat spastic—a desirable alternative to tremor, but a loss if it was formerly unaffected. Whether any of these operations can be used in bilateral cases is open to question, and of course the patient's age and general condition must be carefully considered. The

whole subject is a new one, and the indications for operation will doubtless grow clearer in the next few years.

My own operative experience includes 3 cases in which a complete section of the lateral pyramidal tract was performed on one side, 3 in which a partial section was done and 1 in which a cortical operation was carried out. There were no operative deaths. All patients were improved, moderately or greatly.

ATHETOSIS

Under this term may be included at least many examples of the syndromes of spasmodic torticollis, dystonia musculorum deformans, hemiballism and posthemiplegic chorea. The etiology of most of these conditions is obscure. In many cases there is a history of birth injury or asphyxia. Occasionally they are familial. It is somewhat unusual to be able to trace the disturbance to a vascular accident or injury.

Irrespective of its origin, the disease process affects the basal nuclei, predominantly the caudate. The changes, which may be slight, are usually demonstrable by encephalography.

Physiology

Irrespective of etiology, the diseases included under the term "athetosis" have in common a persistent, irregular involuntary spasm of the muscles involved. Protagonists and antagonists are simultaneously affected, so that the excursions are usually slow, and attended with a considerable output of energy. As a result, the patient perspires, his metabolism rises and the muscles hypertrophy (which seldom occurs in paralysis agitans). While there is seldom a definite pattern or rhythm to the involuntary motions, they are often restricted to one part of the body—the face, tongue, neck, one or both arms, one side or the entire body. The leg is rarely affected alone. The grotesque postures and gestures which the unfortunate victims make often cause them to be regarded quite unjustly as feeble-minded. The movements are more severe when the patient attempts voluntary movement, and also when he is embarrassed or knows that he is being observed—a circumstance which has led to the erroneous opinion that the whole syndrome is of psychogenic origin.

Athetosis of one or more extremities—or even of the entire body—may be accompanied by complete or almost complete voluntary paralysis. In this event, signs of pyramidal tract defect are demonstrable. An alternating tremor may also co-exist.¹⁴

Electromyography shows that the motor units discharge in a normal polyrhythmic fashion, which

doubtless accounts for the rather remarkable rarity of fatigue. What is abnormal is the fact that there is no relaxation of antagonists, and that the movements are involuntary.¹⁵

Medical Treatment

The method of treatment most commonly used is re-education of the affected muscles. The patient is encouraged to take corrective exercises, and practices certain skills under supervision. He is urged to appreciate the sensation of relaxation of muscles and voluntary innervation of movements.¹⁶

This method has been reported^{16, 17} to yield excellent results in certain cases, although from the published accounts it is often difficult to be sure how much of the improvement was in the associated hemiplegic disturbances. In the cases I have seen and followed, the method has produced relatively little in the way of favorable results. There is, of course, no harm in trying it, but in every case the progress should be carefully followed by means of motion-picture records.

Treatment by drugs has in the past been wholly unsuccessful. There seems to be some hope that the use of curare or drugs of similar action may be beneficial,¹⁸ but many difficulties and dangers must be overcome before they can find wide acceptance.

Surgical Treatment

Innumerable orthopedic operations (tendon lengthenings, transplantations, nerve sections) have been employed in the treatment of athetosis, usually without success. Posterior root section is of no value.

The first successful surgical treatment was that applied by Horsley¹⁹ in 1909. He resected the corresponding motor cortex, with relief of the abnormal movements, but a cortical monoplegia resulted. This operation has been used intermittently, and has recently been revived by Bucy and his collaborators,^{20, 21} Sachs²² and Klemme.¹² The reported results are good, but Bucy who has given the matter particular study, recommends it only for cases in which one arm alone is chiefly involved, and the extremity is already useless.

The operation of section of extrapyramidal tracts in the anterior column of the spinal cord, for athetosis, was introduced at the Neurological Unit in 1931.²³ To date, 50 operations have been performed, in 38 cases. There have been 4 operative deaths, of which only 1 (from pneumonia, two weeks after operation) occurred in the last 25 cases. The proportion of improvement is difficult to estimate, 5 patients have been enabled to seek employment and most of the remainder are well.

pleased with the result of the operation, even when the advance consists in no more than being able to lie quietly in bed or sit up in a chair, if this has previously been impossible. In no case has there been complete relief, but the improvement which is secured by the end of convalescence is permanent, unless the progress of the disease destroys other parts of the brain.^{14 23}

Favorable results with this type of operation have also been reported by Oldberg²⁴ and by Machansky.²⁵

SUMMARY

A review of the various subvarieties of alternating tremor (paralysis agitans) and of athetosis (torticollis, dystonia, hemiballism) is presented, including a brief physiological analysis of their manifestations. The methods of treatment of both diseases by drugs, new and old, by retraining and by the various types of operation recently introduced are described, and an attempt is made to evaluate the indications for each and the results to be expected.

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THE QUALITY OF MEDICINE*

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WHAT kind of medicine do you want? Do you want England's medicine, or Hitler's medicine, or Stalin's medicine, or New Zealand's medicine, or American medicine?

Do you want socialized medicine, or state medicine, or democratic medicine? Do you want impersonal medical care or do you want free choice? Do you want bureau medicine, or medicine fostered and promoted by those who have been especially dedicated to the service of the sick? Do you want the doctor an employee of the state working limited hours for a salary?

Are they we be dominated by dictators or by the of alter the people? The future of medicine will that they p by our citizens. If they are ignorant of the of medicine will suffer, if they are

The standard American medicine may go forward all types is the survived the rise and fall of many (Charcot,⁶ 1st

though the presented at the annual meeting of the Vermont State Medical Association October 5 1939 venient form American Medical Association

civilizations. I predict that its advances can be delayed only temporarily, and that they will attain greater heights long after the actors of the present generation have left the stage.

An inspired propagandist says that there are forty million people in the United States who are suffering from the lack of medical care because their incomes are less than eight hundred dollars, with the consequence that they are unable to maintain adequate standards of living. The remedy he prescribes is socialized medicine after the European manner. He views American evolution as immature because we hesitate to embrace social systems which seem to have failed in Europe, and to be poor substitutes for developing programs which have brought medical care in America to higher accomplishments than anywhere else.

The propagandist admits American superiority, which he credits to a higher standard of living. When he contrasts small countries, whose populations are homogeneous, to polyglot America, he

says us a real tribute. The difficulty of matching Denmark in the eradication of syphilis is obvious, but American medicine is enlisted in the fight for that objective.

He says with finality that there is no further need for surveys to uncover the lack of medical care of the unfortunate forty millions—that we now know all there is to know about these neglected people. On the contrary, I believe that there is more need than ever to discover the extent of human suffering among those who are existing miserably and the extent to which medical care fails to reach them.

Every city in the United States has thousands of people who are handicapped by bad housing. Senator Wagner is quoted as saying that there are over four hundred thousand people in the City of New York who live in buildings unfit for human habitation. I can very well believe that story when I am told that there are two hundred and fifty thousand bedrooms in New York City which have no windows. Many of these rooms have multiple occupancy, and all are potentially pestiferous. The government administered City of Washington is said to lead all our cities in slum miseries, as it also leads in the statistics of morbidity. Every one of these city dwellers must be included in the city mullion, but none of them can claim to be outside the areas of free hospital and medical care. Every citizen of the City of New York may have emergency medical care free of cost at any moment of the day or night if he asks for it. We can well believe that it is seldom asked for when the need is not acute through accidental or tragic illness.

Many small towns have hospital facilities available to people whose incomes are eight hundred dollars or less, or who have no income at all, and where a generous medical profession cares for them free or at charges within their means. Many farmers fail to see eight hundred dollars in any year, and still are able to pay for medical care.

No one can deny that there are communities which are poorly supplied with medical care as well as poorly fed and clothed and housed. No one can deny that eleven million people are unemployed. No one can deny that there are still in a few sections of this country where the birth rate is still out of proportion to the supply of food or education.

No one can deny that there are local needs for hospital beds—while at the same time 20 per cent of all hospital beds are unoccupied. It is, however, not a survey but a distortion that tries to show that forty million people are failing to receive medical care, while at the same time death rates are steadily falling. In New York City the sta-

tistics for 1939 are all showing new low records. This is an accomplishment of American medicine. Americans are so hospital-conscious that sixteen people enter a hospital every minute day and night. A baby is born every fourteen seconds, and half these births occur in hospitals.

The fact that 47 per cent of all our hospital beds are occupied by insane people cannot be charged entirely to the failures of medical care, while much of it must be credited to social maladjustments. Surveys are needed more than ever. The Medical Society of the State of New Jersey has just finished a survey which might well serve as a model to reveal the true conditions in every state. It did not make estimates from occasional samplings of the population, but reported every county and every township. This is not too difficult a task and must be done to discover all the facts of supply and distribution and need of medical care.

Every physician in the United States must be enlisted in the search for the truth on which to build the foundations for a master plan. The improvement of living conditions is preventive medicine. It is both a national and a local problem. The New York situation probably involves greater difficulty and cost than are encountered in other cities, but it can be cured by New York money and New York effort. It might be well if the national government would show the world how to do it by staging a demonstration in the District of Columbia. I believe that every physician in the land should get behind slum clearance and demand action from all local and national authorities.

The propagandist proposes to cure all our health deficiencies by imposing upon the American people some of the European systems of sickness insurance. Sickness insurance abroad has not reduced morbidity or mortality, or the loss of time of the worker due to sickness. Foreign sickness insurance does not take care of the indigent. The indigent person is outside the field of insurance and is the problem of the taxpayer.

We must remember our own troubles with compulsory workmen's compensation insurance. Although this procedure has been greatly improved, we must not forget the scandals which accompanied it and which still require constant vigilance.

Although the propagandist admits that health insurance is not a panacea, he thinks that while it is not the ideal system, under the present social and economic conditions of the country compulsory health insurance, combined with extension of public health services, is the best possible solution. The propagandist wobbles again when he advocates the Wagner Health Act and says that it neither carries nor advocates a health insurance scheme. This bill

was introduced on February 28, 1939, on March 29, just a month later, as was expected, the senator's son, Robert F. Wagner, Jr., a member of the Assembly of the State of New York, introduced a compulsory health-insurance bill in contemplation of enactment of the federal measure. Cash benefits for disability and maternity care, he said, were included, because the federal bill makes provisions for aid to the states that provide such assistance. The Wagner Health Act opens the door to potential graft of vast dimensions.

Very few people budget their incomes for anything except rent, heat and light. Budgeting for sickness is now being inspired by hospital and medical service plans which involve small daily payments. These plans, now subscribed to by more than three million people, are helpful to many people and indirectly to physicians, but the experience of the past year has demonstrated such serious abuses of privilege by greedy subscribers that financial collapse is threatening, unless contracts are definitely limited and rigidly enforced. Surpluses melt away under excessive hospitalization, and the purposes of group service are defeated.

It seems inevitable that the insurance principle will be involved in plans for medical service, and it seems wise that many trials be made in the various states, such as are now proceeding in California and New Jersey. The medical profession has developed the high quality of medical care that we now enjoy, and earnestly desires to make it still better.

The propagandist asks whether the quality of medical care is really good in rural districts, where, he says, many doctors still practice horse-and-buggy medicine. I should answer that query by saying that the country doctor has given a very good account of himself, and that the quality of care given to people of small or moderate means in rural districts is often of the highest type.

The general practitioner is the backbone of medicine. In my opinion he would be ruined if he were subsidized. He does the best he can for each of his patients because that is the only way he knows to hold his practice, and he has an honest desire to restore his patients to functional usefulness. By and large the general practitioner is God-fearing—keeps the Decalogue and cherishes his sworn obligations. I should like him to take a more serious interest in local political machinery, and to use his great influence in the betterment of the public health through the practice of preventive medicine. I should like him to realize how great is his potentiality in stimulating his patients and all their contacts in the guidance and in-

formation of legislators who seldom understand the physician's viewpoint.

Every physician should have a copy of the proposed Wagner Act and should be shown the danger to himself of its provisions. Every physician should in turn advise all his patients and acquaintances of this danger, at once, and should ask them to bring pressure to bear on their legislative representatives, state and national, to defeat this legislation.

Although this measure was not acted on at the last session of Congress, it will appear at the next in amended form with an emotional appeal for the spending of millions for the promotion of public welfare—just another act in an orgy of spending for prosperity, and of handing over the practice of medicine to bureaus in Washington. Everyone should know that the estimated overhead expense of these bureaus in the administration of this act will be six million dollars. Sending a dollar to Washington does not make it bigger. I am convinced that this state will be better off by keeping its money at home—by developing the strength of its own department of health and by supporting its physicians in the practice of better medicine for all the citizens.

You must not take a negative position. Through the influence of systematized adverse propaganda, an impression has been created that the medical profession, and especially the American Medical Association, is against all progress, against any change in delivering medical care, and is acting in restraint of those who would try new plans. People should be told that these statements are untrue and unfairly presented, and should be told what American medicine really stands for.

Over a hundred years ago, in 1835, the vital statistics of Philadelphia revealed that the average expectation of life was twenty-one years. Preventive medicine, carried on by doctors, mostly private practitioners, in the United States, has raised life expectancy to above sixty years. This has been accomplished largely through the salvage of children who otherwise would have died from the ravages of communicable diseases.

One hundred and fourteen thousand of the one hundred and twenty-five thousand actively practicing physicians of the United States are members of the American Medical Association. This is organized medicine. Organized medicine stands for the protection of children from all communicable diseases by scientific methods and for the care and improvement of deformed or crippled children, for the protection of children from accident and injury, from blindness, from the exhaustion of child labor and from tuberculosis. It stands for nutritional improvement. Organized medicine,

through private practitioners and hospital practitioners, has been steadily improving the growth and health of children for many years.

Organized medicine is intensely interested in race improvement and in the science of immunology. It gets very little help from legislators for the promotion of compulsory vaccination against smallpox. Thousands of children evade vaccination. Thousands of cases of smallpox, all preventable, prevail at all times in this worst vaccinated of all civilized countries. One case appeared in New York City last month and 14,335 were reported last year in the United States.

Organized medicine is constantly studying the problem of maternal mortality, and recent statistics show substantial gains in a nation-wide effort to salvage future mothers. It stands for prevention of communicable venereal diseases, for public health, for sanitation, for good education, for good food and drug laws, for good housing. It stands for better education of physicians, in order to implement them for the practice of better medicine.

It stands for having all the hospital beds that are needed, placed where they are needed. It is for all the state medicine that is needed for the care of the insane, the feeble-minded, the tuberculous and the indigent. It is for every effort that can be made by public-health services for the eradication of syphilis. It is for preventive medicine of all kinds. It is for co-ordination of all national health services, except those of the Army and Navy, into a national health department headed by a secretary of health.

It is against compulsory sickness insurance, and against the administration of medical practice by national bureaus. It is for the preservation of the practice of medicine by the family physician, so far as possible.

The old family doctor has nearly finished his career. He has carried the tradition of true philanthropy into every personal relation. His devotion to his self-imposed obligations has kept him out of the public notice. He quietly answers the call of the sick without self-consciousness or self-pity. He carries on unnoticed, unless like Doctor Dafoe he officiates at a quintuplet delivery or performs some dramatic service which is heralded in headlines. His skill is unknown beyond the immediate circle of his limited acquaintance. He never advertises. He holds no public office. He cannot leave his patients long enough to go to the legislature. His place is at home, trying to keep people well or curing the sick. His influence on public affairs is small because he is too busy to become an active partisan. He does not make much of an income because he is generously appreciative of the financial difficulties of his patients.

He is no longer a saddle bag doctor dispensing empiricisms. He no longer drives a characteristic gig. His high hat and his gold-headed cane are no longer symbolic. He has been well educated in the medicine of his period. His preceptorial training in the use of his powers of observation, in deduction and in the high development of his own senses, often more than five of them, has yielded to the deeper searching into the mysteries of bacteriology and of internal secretions. He has learned the value of mechanical helps. Unless he has been practicing longer than fifty years he is not an old doctor at all. Within fifty years he has become a modern doctor, because modern medicine is all measured within this last half-century. The metamorphosis of the old family doctor has been so gradual that he has passed on to this new doctor the age-old interest in the poor and afflicted. Although the new doctor raised his right hand and promised to keep sacredly the Hippocratic oath, he only subconsciously knows the text of his affirmation. The spirit of Hippocrates, of Luke the beloved physician, of Harvey, of Jenner, of Lister, of Osler and of Welch, has become the motivation of the Dafoes and thousands like him who never see their names in print.

The self-imposed two thousand year-old Hippocratic code has become the very fiber of the new doctor's impulse to carry on in high fidelity his consecration to the service of the sick. His cultural and technical training covered almost thirty years of his life. At twenty-seven he received his diploma, and thereafter served one or two years as an intern before starting to exercise his licensed right to practice medicine.

In the mad nineteen twenties the fashionable specialties lured many young doctors into those lucrative fields. In the depressive cycle of the nineteen-thirties the family doctor has been much less embarrassed than the limited specialist, whose practice in many instances disappeared because patients could no longer pay his fees. In this period the family doctor has complained very little, and has cared for his patients regardless of fee, in many cases living on goods given in barter, even in large cities. He and his family have shared hard times before and will do so again. In some regions he refused government aid, while in other regions he now regrets that he has accepted government employment at low or never-paid fees. In large cities his position is more difficult than in small towns or rural regions. The city hospitals are crowded, not only with the normally indigent but also with people who formerly were able to pay for medical care. The doctor works in the hospitals and clinics and often meets his former patients there. He is the only person in the city hospital who works

without pay. Because he has always done so is not a good reason for his continuing to do so.

He works in the hospital for the pay of experience, for the pay of prestige, for the pay of promotion to places of prominence where he may receive the pay of larger responsibilities. He works to learn more about medicine in order to be qualified to learn more about medicine. He is retired for age at sixty-five while he is still a student, and he cannot be made to regret it. The doctor is the servant of the sick, and when he serves the really poor he considers it a priestly privilege. People who are unable or unwilling to pay for medical care crowd free dispensaries to the doors. They are mostly uninterested in the personality of any doctor; their chief interest is in getting something for nothing, and they submit to mass medicine because they must. One hundred and twenty patients in a medical clinic being served by four doctors in two hours means an average of four minutes for each interview, and is very poor medicine. During the same time the same waiting-space holds many other people waiting for other clinics, every one of which is crowded beyond comfortable limits. The clinic nurses and clerks work all day at high speed and are paid for their work. Doctors come and go for two hours or longer, giving their services absolutely free. Some of them are specialists, but most are general practitioners. Although many people are in need of medical service at low fees, and the cost to the city is small because the doctor is unpaid, many doctors would be glad to treat these patients in their own offices for nominal charges, and to give them better care than the hospital, because it would be individualized and unhurried. It would seem to be only fair that doctors as well as other people who work in tax-supported hospitals, or other government institutions, should be paid for their work. At present there is no money to pay them with. Doctors of various kinds who now work for the government receive salaries so small that in ordinary times their positions are unattractive. The government being unable to balance its budget, the prospect of seeing the doctor paid by the state is remote. The family doctor is aware that his status is changing, and desires to be one of the controlling factors in any new program. He justly resents the imposing on him of any compulsory program by nonmedical organizations. He believes that the American Bar would resent the imposition upon it of a program to regulate the practice of the family lawyer in much the same spirit.

The family doctor realizes the value of discussion of every phase of medical service, and is greatly interested in various plans now being put into

experimental operation by county medical societies. He believes that the care of the sick is a medico-sociologic problem, and that all doctors should be organized to attempt a solution. He believes that the old types of individualism will be limited to unhurried study in limited fields involving investigative science.

He disbelieves in the practicability of extending the fields of state medicine, because the burdens of the state already excessively overload the taxpayer. He sees state education in difficulty because it has grown too expensive for the community pocket. He sees thousands of teachers unpaid and out of work, teacher training schools closed, few new teachers appointed; he draws an analogy between state education and state medicine, and believes that a similarly planned system of state operated medical service would be an insufferable load, no matter how honestly it might be attempted. He believes that in any such system expensive bureaucracy would be inevitable, so that the doctor would become a poorly paid servant, his ambition to pursue scientific study would be dulled and general medical service would sink to degraded levels. Such a system cannot escape political manipulation. The legislature which votes the money for it will demand its administration by political officers. It is claimed that public opinion will guide these officers toward wisdom and honesty, but we cannot escape historical precedents which have always shown undue official absorption of the taxpayers' contribution to any public operation. State medicine as we now have it is not attractive to the family doctor; he sees a few brilliant career men who have fought their way to the top, but he believes that most of the rank and file of the lower grades have been lured into the service by the prospect of soup-bone security. The family doctor thinks of state medicine only in terms of relief from financial worries. When the doctor is making a living he forgets it, and turns again to the absorbing interest of giving the best that is in him to his patient; he feels that the government doctors' viewpoint is colored by a salary, and that from their safe vantage point they have lost an understanding of intimate medical problems.

The family doctor is acutely aware that the application of medicine lags behind the science of medicine; he laments the uneven distribution of medical service, even as he is saddened by the tales of inadequate housing and clothing and feeding of some people. The family doctor is in no sense a parasite living well upon the community; he is always willing to share common privation. The profit motive is not large in the doctor's life, but

the incentive to make a living is ever present. Paid research workers represent a very small portion of the medical profession, and the fact that they have not been demoralized by their salaries, often pitifully small, is not an impressive argument for subsidizing the whole medical profession.

The presence of too many doctors, preventive medicine and declining mortality and morbidity as shown by current statistics, cannot be denied as economic factors. Few doctors have acquired wealth from the practice of medicine. Thirty per cent of them are said to be failing to make their expenses. In the light of such a statement the value of the doctors' contribution to the health of the nation is amazing.

The old family doctor of blessed memory is leaving the scene, but his successors are growing,

in effectiveness, and in the interest of the health of the nation deserve the unqualified support of all Americans.

I believe that our people would be responsive to an American health program if the physicians of the country could be inspired to write it. I believe that it should demand the consolidation of all national health bureaus into a national department of health headed by a cabinet officer. I believe that it should strongly preserve the quality of medical care—competently distributed. I believe that the units of health administration should be the states and their political subdivisions where local health needs are known. And I believe that the general practitioner should be supported in his relation to the American family.

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CARCINOMA OF THE UTERINE CERVIX*

The Results of Treatment Through 1933, Showing the Value of Supplementary X Radiation

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EXPERIENCES with carcinoma of the uterine cervix at the Free Hospital for Women have been briefly recorded through 1928.¹ The purpose of the present survey, which takes the place of those now obsolete reports, is to revise the figures for results in the light of longer and much more complete follow up, to embrace in the evaluation those cases seen through 1933, to trace the development of this clinic's treatment and to discuss various pertinent aspects as they arise in the course of compilation.

From May 1, 1876, to January 1, 1934, 997 consecutive patients recorded as having cancer of the cervix were seen or treated. For the purposes of this report it seems proper to omit from detailed consideration 69 of this number who had had their primary treatment elsewhere and were only secondarily seen, treated or given terminal care here.‡

In preparing the material for the previous reports, the authors accepted the clinical diagnoses of cases from which

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Of the 28 patients of the latter group receiving no further treatment at this hospital, 2 were alive thirteen years after primary therapy by radium therapy; the remainder dying before five years. Forty-one received extensive treatment, of whom 34 failed to survive five years, 1 died of recurrence seven years after first therapy and 6 were still on last follow-up, five, seven, seven, seven, ten and thirteen years, respectively, after first treatment.

tissue had not been removed for pathological examination. When patients with only a clinical diagnosis of cervical cancer fail to survive, one tends to assume that the diagnosis was correct because this is the commonest pelvic cancer in women. When however some of these patients are cured the results are of debatable value for statistics without pathological confirmation. In order to avoid the inclusion of these few valueless cases among authentic survivors, and since the diagnoses of those who die remain presumptive (as so well demonstrated by the death certificates of patients who have died away from their place of original diagnosis), 100 cases without pathological diagnosis (75 before and 25 after October 1, 1902) will be evaluated separately.

For the previous papers the authors accepted the pathological reports as given without attempting to review the sections. This raises the question as to how much reliance may be placed upon pathological diagnoses when the microscopic material is no longer extant. We have now taken the stand that a report is not valid unless accompanied by the section or an adequate description of the microscopic picture for it could be argued that the report may have been erroneous, and in general the earlier reports lacked satisfactory descriptions. The 48 cases (33 before and 15 after October 1, 1902) with pathological diagnoses unsubstantiated by section or description will be

†The death certificates of 394 patients covered in this study have been consulted. Cancer was not mentioned in 4 of the alleged causes of death in these being cerebral hemorrhage, purpura myocarditis, pneumonia, shock and kidney trouble. Natural causes, probably heart disease, chronic Bright disease, diabetes, septicemia, phthisis, intestinal obstruction, furia prodiosa with structure and "no cause given." Carcinoma of the cervix was specified in 390 certificates. Of 78 certificates on 27 cancer was mentioned without specification of origin or location. Cancer of the uterus or symphysis were found on 209 and on 15 more. Cancer of uterus, bladder and cervix, of uterus and bladder of uterus and rectum, of uterus and ovary or of uterus and intestines or carcinoma of uterus were found. The remaining 11 or stomach, intestines, sigmoid, rectum, bladder, pelvic organs, hip, intestines and stomach, gilda and bladder, pelvis and abdomen, growth of undetermined nature, in abdomen, malignant disease of pelvis and natural causes, probably cancer.

without pay. Because he has always done so is not a good reason for his continuing to do so.

He works in the hospital for the pay of experience, for the pay of prestige, for the pay of promotion to places of prominence where he may receive the pay of larger responsibilities. He works to learn more about medicine in order to be qualified to learn more about medicine. He is retired for age at sixty-five while he is still a student, and he cannot be made to regret it. The doctor is the servant of the sick, and when he serves the really poor he considers it a priestly privilege. People who are unable or unwilling to pay for medical care crowd free dispensaries to the doors. They are mostly uninterested in the personality of any doctor; their chief interest is in getting something for nothing, and they submit to mass medicine because they must. One hundred and twenty patients in a medical clinic being served by four doctors in two hours means an average of four minutes for each interview, and is very poor medicine. During the same time the same waiting-space holds many other people waiting for other clinics, every one of which is crowded beyond comfortable limits. The clinic nurses and clerks work all day at high speed and are paid for their work. Doctors come and go for two hours or longer, giving their services absolutely free. Some of them are specialists, but most are general practitioners. Although many people are in need of medical service at low fees, and the cost to the city is small because the doctor is unpaid, many doctors would be glad to treat these patients in their own offices for nominal charges, and to give them better care than the hospital, because it would be individualized and unhurried. It would seem to be only fair that doctors as well as other people who work in tax-supported hospitals, or other government institutions, should be paid for their work. At present there is no money to pay them with. Doctors of various kinds who now work for the government receive salaries so small that in ordinary times their positions are unattractive. The government being unable to balance its budget, the prospect of seeing the doctor paid by the state is remote. The family doctor is aware that his status is changing, and desires to be one of the controlling factors in any new program. He justly resents the imposing on him of any compulsory program by nonmedical organizations. He believes that the American Bar would resent the imposition upon it of a program to regulate the practice of the family lawyer in much the same spirit.

The family doctor realizes the value of discussion of every phase of medical service, and is greatly interested in various plans now being put into

experimental operation by county medical societies. He believes that the care of the sick is a medico-sociologic problem, and that all doctors should be organized to attempt a solution. He believes that the old types of individualism will be limited to unhurried study in limited fields involving investigative science.

He disbelieves in the practicability of extending the fields of state medicine, because the burdens of the state already excessively overload the taxpayer. He sees state education in difficulty because it has grown too expensive for the community pocket. He sees thousands of teachers unpaid and out of work, teacher training schools closed, few new teachers appointed, he draws an analogy between state education and state medicine, and believes that a similarly planned system of state operated medical service would be an insufferable load, no matter how honestly it might be attempted. He believes that in any such system expensive bureaucracy would be inevitable, so that the doctor would become a poorly paid servant, his ambition to pursue scientific study would be dulled and general medical service would sink to degraded levels. Such a system cannot escape political manipulation. The legislature which votes the money for it will demand its administration by political officers. It is claimed that public opinion will guide these officers toward wisdom and honesty, but we cannot escape historical precedents which have always shown undue official absorption of the taxpayers' contribution to any public operation. State medicine as we now have it is not attractive to the family doctor, he sees a few brilliant career men who have fought their way to the top, but he believes that most of the rank and file of the lower grades have been lured into the service by the prospect of soup-bone security. The family doctor thinks of state medicine only in terms of relief from financial worries. When the doctor is making a living he forgets it, and turns again to the absorbing interest of giving the best that is in him to his patient, he feels that the government doctors' viewpoint is colored by a salary, and that from their safe vantage point they have lost an understanding of intimate medical problems.

The family doctor is acutely aware that the application of medicine lags behind the science of medicine, he laments the uneven distribution of medical service, even as he is saddened by the tales of inadequate housing and clothing and feeding of some people. The family doctor is in no sense a parasite living well upon the community, he is always willing to share common privation. The profit motive is not large in the doctor's life, but

charged as well on the nineteenth postoperative day her convalescence having been complicated by pelvic sepsis of only moderate severity and died eighteen days later of unknown cause. We have rated this an operative death. There was a postoperative complication in 2 cases in this group a small incisional hernia in a cured patient, and in another a vesicovaginal fistula which healed spontaneously

Three of the patients treated with radium after operation developed fistulas: the vesicovaginal fistula of one was present six months after radium treatment, an attempt at closure failed and the patient died of recurrence four years and five months after hysterectomy. Both rectovaginal and vesicovaginal fistulas, completely inoperable, followed postoperative radium in the other two patients, who were

TABLE 2. Summary of Treatment and Results 1914 to 1918 Inclusive

| TREATMENT | NO. OF CASES | OPERATIVE DEATHS | PATIENTS UNTRACABLE AT 5 Yr. | PATIENTS ALIVE AT 5 Yr. |
|---|--------------|------------------|------------------------------|--|
| Untreated | 9 | — | 2 | 0 |
| Radical operation | 25 | 3 (12%) | 0 | 11 |
| Radical operation, then radium (1 to 11 mo. postoperatively) | 11 | 0 | 0 | 27 |
| Five-year survivors of above two groups — 13 (33 per cent) | | | | |
| Radium, then radical operation | 10 | 1 (10%) | 1 | 28 |
| Radium | 23 | 0 | 0 | 0 |
| Totals | 79 | 4 (6%) | 3 (4%) | 15 (19% of total seen; 21% of total treated) |
| Cases — 8 (10 per cent of total seen; 11 per cent of total treated) | | | | |

*Well 15 yr later 5; untraceable 2 yr later 2; died of "heart trouble" 10 yr later 1; died of recurrence 3 yr later 1; radium for recurrence 3 yr later died of disease 4 yr later 1; radium for recurrence 1 yr later died of anemia following exploratory laparotomy at which time tumor was found to involve the uterus, 4 yr later 1

†Died of "carcinoma of liver metastatic from cervix" 10 yr later 1; died "suddenly" (aged 68) 11 yr later 1.

‡Died of pneumonia 6 mo. later 1; died of unknown cause 1 yr later 1.

seven months after operation and two and a half months before death from recurrence.

During this period radium was first employed. The dosage and screening were almost entirely a matter of trial and error, there being practically no precedents on which to base the manner of use. Four capsules of 0.5 mm. of silver containing glass capsules filled with radium salt, the equivalent of 25 mg. of metallic radium each

the long time survivors in this group. One of those receiving radium before operation established a rectovaginal fistula within two months of operation and died of recurrence one year and eight months later.

During these years there was, in general no definite plan behind the administration of radium before and after surgery. Preoperative radium was given in varying doses at varying intervals up to six months in otherwise seem-

TABLE 3. Summary of Treatment and Results 1919 to 1923 Inclusive

| TREATMENT | NO. OF CASES | OPERATIVE DEATHS | PATIENTS UNTRACABLE AT 5 Yr. | PATIENTS ALIVE AT 5 Yr. |
|--|--------------|------------------|------------------------------|--|
| Untreated | 5 | — | 1 | 0 |
| Radical operation | 16 | 1 (6%) | 0 | 9 |
| Radical operation, then radium (1 mo. to 3 yr post operatively) | 13 | 0 | 0 | 5† |
| Five-year survivors of above two groups — 14 (45 per cent) | | | | |
| Radium, then radical operation | 2 | 0 | 0 | 0 |
| Radium | 82 | 1 (recaps.) | 1 | 14‡ (17%) |
| Totals | 120 | 2 (2%) | 2 (2%) | 23 (23% of total seen; 24% of total treated) |
| Cases — 12 (10 per cent of total seen and of total treated) | | | | |
| Ten-Year Survivors — 14 (12 per cent of total seen and of total treated) | | | | |

Well 9 to 13 yr later 3; untraceable 2 yr later 1; died of carcinoma of stomach 10 mo. later 1; died of carcinoma of sigmoid 5 yr later 1; died of recurrence 2 mo. later 2; died of recurrence 2 yr later 1

†Well 12 yr later 1; died following operation for intestinal obstruction (no cancer found) 3 yr later 1; died of recurrence 2 mo. later 1; died of recurrence 1 yr later 1; radium for recurrence 2 and 3 yr later died of the disease 2 yr later 1.

‡Well 9 to 14 yr later 6; untraceable 1 yr later 1; died of cardiovascular disease 6 yr (aged 67) and 9 yr (aged 62) later 2; died of pneumonia 10 yr later 1; died of recurrence 1 and 2 yr later 2; radium for recurrence 2 yr later died of recurrence 1 yr later 1; radium for recurrence 1 yr after first application, died of congestive heart failure (aged 75) 8 yr later 1

made up this hospital's original stock. The only other screening was the rubber used in application according to Graves⁴ that is, the capsules were placed in tandem in rubber tubing for intra-cervical and uterine insertion and plastered to coins and covered with rubber dam for cervical and vaginal abutment. Single doses varied from 600 to 4800 mg. hr., total doses from 600 to 11,200 mg. hr. One to four treatments were given the intervals between them ranging from one week to five months. A few deaths might be attributed to overdosage were it not that only well-advanced cases were given irradiation the more favorable ones being reserved for operation.

ingly inoperable cases, in the hope of rendering them operable. The number of cases so managed was small and the outcomes were disappointing, for the apparently obvious reason that the periphery of the disease was not effectively irradiated. Following operation radium was usually not applied until recurrence was present. It seems that during these early years this element was regarded more as a palliative than as a prophylactic or curative method. Furthermore, the postoperative doses were kept small, 600 to 1600 rarely 2400 mg. hr., for fear of damage to the bladder or rectum. Since radium was not employed immediately after operation unless there was

real doubt as to the completeness of the extirpation, and since it was used later in those cases in which operation clearly had not been successful, a fairer estimate of the results of surgery is obtained by combining the "operation" and "operation, then radium" groups in calculating five-year survivors.

From 1919 to 1923 — 120 Cases (Table 3) Only 1 of the patients submitted to operation developed an incisional hernia. Another reported herself well fourteen months after operation and died of intestinal obstruction one month later. Two other cases of obstruction among the patients of this period are recorded in Table 3. In the radium-treated group, 3 patients developed vesicovaginal fistulas and 3 rectovaginal fistulas. Both types of fistula became established in 2 others. Since all these were terminal cases, it is impossible to estimate how much of the damage was due to irradiation.

During this era the tendency was to reduce the number of doses of radium and the intervals between them. Quite

From 1924 to 1928 — 225 Cases (Table 4) Deaths from radium in hopeless cases are possibly more frequent than recorded, not only because it is difficult in such cases to separate the untoward effects of treatment from those caused by progress of the disease, but also because so often adequate clinical details of terminal courses are lacking. The 2 deaths following radium were due to sepsis eighteen and sixty-five days, respectively, after application. It apparently is simply a matter of good fortune that such outcomes are not more frequent, since a considerable number of patients with pelvic inflammation or dangerously infected cancers, or both, must of necessity be manipulated and irradiated. Two other patients had post-radiation cellulitis and abscess without fatality, although they were very ill for three months and had then only a short period of comfort before succumbing to their cancers. Six patients, who failed to survive five years, came to colostomy for obstruction from the disease three months to two years and ten months after radium treatment. Another obstruc-

TABLE 4 Summary of Treatment and Results, 1924 to 1928, Inclusive

| TREATMENT | NO. OF CASES | OPERATIVE DEATHS | PATIENTS UNTRACEABLE AT 5 YR | PATIENTS ALIVE AT 5 YR |
|--|-----------------|---------------------|------------------------------------|--|
| Untreated | 7 | — | 0 | 0 |
| Amputation of cervix then radium | 1* | 0 | 0 | 0 |
| Radical operation | 24† | 1 (4%) | 0 | 15‡ |
| Radical operation then radium (1 mo to 3 yr post operatively) | 8 | 0 | 0 | 2‡ |
| Five year survivors of above two groups — 17 (>3 per cent) | | | | |
| Radium | 185** | 2 (1%) | 5 | 46‡ (25%) |
| Totals | 225 | 3 (1%) | 5 (2%) | 63 (28% of total seen 29% of total treated) |
| Cures — 27 (12 per cent of total seen and of total treated) | | | | |
| TEN YEAR SURVIVORS — 46 (20 per cent of total seen 21 per cent of total treated) | | | | |

*Died of cardiovascular disease 4 yr after operation

†Died of cerebral hemorrhage 2 yr after operation 1

‡Well 5 to 9 yr later 11 untraceable 1 yr later 1 died of cardiovascular disease 3 yr later, 1 died following operation for primary carcinoma of sigmoid 3 yr later 1 died of recurrence 3 yr later 1

§Well 7 yr later 1 died of recurrence 1 yr later 1

**Died of cardiovascular disease (aged 49 50 65 67 75 and 76) before 5 yr after operation 6

‡Well 5 to 10 yr later 28 died of pneumonia (aged 53) 2 yr later 1 died of cardiovascular disease (aged 65) 4 yr later 1 untraceable 3 yr later 1 died of carcinoma of bladder 3 yr (aged 75) and 5 yr (aged 82) later 2 died of adenocarcinoma of rectum 4 yr later 1 left eye enucleated for melanoma of choroid 4 yr after radium died of metastatic melanoma 6 yr later 1 died of pyonephrosis (aged 76) 6 yr later 1 died of diabetes (aged 69) 6 yr later 1 died of cardiovascular disease (aged 74) 7 yr later, 1 operation for primary vulvar carcinoma 2 yr later operation for recurrence of vulvar cancer 4 yr later well since then 1 died of recurrence within 1 yr 4 died of recurrence 3 yr (aged 63) and 4 yr (aged 72) later 2 exploratory laparotomy with implantation of radon in lymph node at bifurcation of left common iliac artery 1 yr after radium well at 5 yr despite mass in left side of pelvis died 6 yr (aged 62) later 1

a few single treatments were given. It is interesting that 3 of the absolute cures were achieved with a single application each of 2400 to 2550 mg hr and 2 with 3150 and 3375 mg hr, respectively. These were the first favorable cases in which radium was tried in preference to surgery because the patients were poor risks on account of old age, obesity and cardiovascular disease. Large amounts of radium were avoided apparently because of the fear of complications, a fear unfortunately engendered by earlier experiences in which the complications of advancing disease had been mistaken for ill effects of irradiation, and in a few of which the dire effects of overdosage had been observed.

In March, 1922, the hospital's stock of radium was augmented to 225 mg by the addition of two 50-mg capsules and two 12.5 mg needles. There was no change in screening or technic of application, and the postoperative doses remained small. At first there was some timidity about leaving as much as 200 or 225 mg in a patient for more than twelve or fourteen hours, but in 1923 single doses of 200 or 225 mg for twenty-four hours gradually became acceptable.

In this radium-treated group occurred in the patient listed in Table 4 as having died of carcinoma of the rectum nine years and three months after the first treatment — by 4800 mg hr in October, 1924, for frank squamous carcinoma. At five years she was well and examination disclosed no evidence of recurrence. Two years and three months later she returned, having had rectal pain and bleeding for three months. Under anesthesia an annular constriction of the rectum at the level of the cervix was palpated — surface biopsy showed necrotic tissue. Curettage of the endocervix brought away tissue which Dr. Frank B. Mallory termed adenocarcinoma of intestinal origin. There was fixation of the broad ligaments. One hundred milligrams of radium were left in the cervical canal and vaginal vault for twenty-four hours. Two weeks afterward colostomy was made for obstruction, the patient survived for two more years. Although her death is attributed to cancer of the rectum, she may well have had deep pelvic recurrence of her cervical tumor as well.

Still another obstruction occurred, in this case due to an irradiation stricture of the rectosigmoid that manifested itself five months after application to the cervix and uterus.

of 200 mg., screened by 0.5 mm. of silver and 1.0 mm. of brass, for 30 hours. A colostomy was made. Five years and six months later resection of the rectosigmoid and tube anastomosis were performed preliminary to closure of the colostomy. The patient was well ten years and ten months after radiation.

Only one other complication of any severity took place among the 34 patients of this radium treated group (the majority receiving single doses of 4800 to 6000 mg. hr.) who were alive ten or more years later namely a rectal stricture demanding dilatation seven months after 6750 mg. hr. screening as above—the patient since remaining well for ten years. The relative infrequency of serious complications from radium in those patients who are destined to survive is indicated in Table 3 (only one obstruction in the radium group and that after a heavy retreatment for recurrence) and is quite apparent in this larger series.

Five patients of this same group developed fistulas a

25 mg. and two more 50-mg. capsules of radium were added to the hospital's stock in the spring of 1928, making a total of 425 mg. and thus allowing more latitude in the matter of amount and distribution.

From 1929 to 1933—274 Cases (Table 5) Beginning sporadically in October 1930 and with increasing frequency through 1932, radium was administered in two doses of 2400 to 3600 mg. hr. each within a month usually within two weeks of each other for a total of 4800 to 6000 mg. hr., and occasionally even more. Moreover early in 1931 additional screening of 1 mm. of lead was built around the brass-tube applicators with the intention of obtaining by such filtration pure, very short-wave gamma radiation. A comparison of the results from radium alone in Tables 3 and 5 reveals an increase of five year survival from 17 to 25 to 28 per cent during the years when fairly radical changes in technique were being introduced. Nevertheless it is impossible to show that these improved results were not a coincidence or due simply to the em

TABLE 5 Summary of Treatment and Results 1929 to 1933 Inclusive

| TREATMENT | No. of Cases | Operative Deaths | Per cent Then Unresectable 5 Yr. | Per cent Alive 5 Yr. |
|--|--------------|------------------|----------------------------------|--|
| Limited | 3 | — | 0 | 0 |
| Amputation of cervix | 1 | 0 | 0 | 1 |
| Amputation of cervix and irradiation | 3 | 0 | 0 | 2 |
| Hysterectomy | 1 | 1 (pneumonia) | 0 | 0 |
| Hysterectomy then irradiation (within 2 mo.) | 4 | 0 | 0 | 4 |
| Radium, then hysterectomy | 2 | 0 | 0 | 1 |
| Radical | 106† | 4 (4%) | 4 | 30‡ (28%) |
| Radium, then x-radiation | 154† | 0 | 1 | 65‡ (42%) |
| Total | 24 | 5 (%) | 5 (2%) | 103 (38% of total seen and of total treated) |

Well 5 yr. later

†Died of intercurrent disease within 5 yr. 2.

†Died of cardiovascular disease (aged 64, 67, 70 and 86) 7 mo. to 2 yr. later 4 died of recurrence 1 mo. later 1

†Died of cardiovascular disease (aged 53, 53, 66, 66 and 81) within 5 yr. 5

†Radium and x-radiation for squamous cell carcinomas of left lower vagina and left labium minus (?) recurrence, or primary? 10 mo. later 1; x-radiation for recurrence in sigmoid 9 mo. later all 6 comfortable 1 yr. later 1; died of complications without recurrence 3 mo. later 1; died of recurrence 4 mo. later 1

vesicovaginal sinus appeared one month after radium treatment in an advanced case a rectovaginal fistula opened nineteen months after radium treatment, the patient surviving for twenty-one months afterward another patient's rectovaginal fistula appeared terminally. Two other patients had double fistulas terminally.

There were complications in 2 of the patients submitted to hysterectomy a postoperative hernia, and a vesicovaginal fistula which was closed successfully one year after operation and one year and eleven months before death from recurrence.

Of those patients receiving radium following operation one died after enterostomy for small intestinal obstruction from recurrence another developed double fistulas terminally.

The majority of the radium treatments during the years 1924 to 1928 consisted of a single dose of 200 or 225 mg. for twenty-four to thirty hours, the largest single dose being 6750 mg. hr. By April 1925 applicators of 0.5 mm. of brass (namely tubes of various lengths for carrying the capsules of radium into cervical and uterine canals, and round, flat pillboxes to hold the capsules against the cervix and the vaginal fornices) had been devised and were being put into use, their purpose being to increase screening and to facilitate the placing and holding of the radium. In 1927 a new set of practically identical applicators, but containing of 1 mm. of brass, was put into regular service.^{2,4} The rationale of the brass filtration was to eliminate almost all the so-called "soft" or ulcerative radiation. Four more

employment of large doses of radium, or that they were the result of the use of the applicators and the augmentation of filtration. It can be stated only that the applicators have facilitated the handling and placing of the radium, and that they may have played a part in preventing further complications from irradiation among the survivors. The fact that no late recurrences have yet made their appearance among those treated by radium alone between 1929 and 1933 inclusive, although 19 of the 30 five year survivors have already reached their seventh to tenth year suggests an increased effectiveness of technique.

The main objective of the two-dose plan was to make the second dose more effective by eliminating the local disease with the first for example it is often impossible to locate the cervical canal in cases with everting growths, and even if the canal can be found the disease may be tamponading the surrounding tissues away from the radium. By the time of the second application the condition is nearly always markedly improved—the canal can easily be found and the surrounding tissues have returned to more normal position, owing both to dissolution of the cancer and to better drainage, with alleviation of edema and possibly local infection as well. (The same effect has been accomplished by the use of x-rays before radium, a procedure followed almost consistently at this clinic since the fall of 1937.) Since 1932 the double-dose method has been employed in the majority of cases.

Furthermore, in the spring of 1931 we began using x-ray therapy and by 1932 this was prescribed almost routinely

(exceptions were made for the very earliest cancers), the purpose being to reach areas of disease that were inaccessible to the influence of radium. Dr John W Meachen, roentgenologist to the Free Hospital for Women from 1924 to 1937, heartily co-operated in taking charge of practically all the treatments. Portals of entry varied from 10 by 10 to 20 by 20 cm., target distance was 50 cm., filtration consisted of 0.5 mm of copper and 1 mm. of aluminum, kilovoltage varied from 180 to 200, and milliamperage from 5 to 8. Individual treatments of 400 to 930 r were given, the great majority being of 400 r. Treatments were administered daily for three or four, usually four, days and through three or four, usually four, portals, one or two anterior and two posterior. In general the patients received a series of four treatments, totaling 1600 r, immediately on discharge following examination under anesthesia, biopsy and first application of radium. A second series was given usually about two months after the first. Quite a few patients received a third series, and a number even a fourth series. Actually there was considerable variation, both as to intervals between series of treatments and as to total dosage administered. All patients who received any x-radiation at all are included in the radium and x-ray group, but 21 received 1600 r or less for various reasons and 33 got 2800 r or less, the remaining 121 receiving total doses of 3200 to 8200 r. One hundred and nine patients of the whole group of 154 either had as much x-radiation as they were to get within six months of first radium treatment, or had 3200 r of their total quotas within six months. Twenty-one began to have x-radiation six months to a year after first radium treatment, and 24 began to have x-radiation over a year after first radium treatment. The reason why these patients received their x-ray treatment so late is because immediate postoperative x-radiation had not been adopted at the time of their first admission—they were referred for x-ray from the follow-up clinic on the supposition that this, though given late, might do them more good than harm. We have come to believe that the best procedure is to give all irradiation within a period of four to six weeks.

DISCUSSION

Results of Treatment in the Groups Summarized in Table 5

Amputation of the cervix and irradiation The 2 survivors in this group had had x-ray in addition to radium following operation, at which 1 patient was found to have endometriosis of the rectovaginal septum and early, though grossly apparent, cancer. Because she had prolapse with symptoms, and there being no other palpable evidence of endometriosis or cancer, amputation and plastic were elected. One month later 200 mg of radium was applied locally for twenty-four hours, and within six months three series of x-ray treatments totaling 8370 r were given. A severe generalized pelvic reaction ensued, culminating in a rectovaginal fistula eleven months after operation, in addition to about a year of invalidism. The patient was well and had only mild annoyance from the fistula six years and ten months after amputation of the cervix. Her cancer obviously had been overtreated, but we have wondered whether internal, intangible endometriosis might not have contributed in some way to the unusually severe reaction.

Hysterectomy and irradiation The 4 patients

who received hysterectomy and then irradiation had radium locally within two months of operation, 2 of them received x-radiation also. Complications developed in one of the latter—cystitis coming on thirteen months from the beginning of irradiation, giving symptoms for six months and persisting for a year, during which several dilations of a stricture of the right ureter were performed, there being some hydronephrosis, and a postoperative hernia, repaired early in the sixth postoperative year, by which time the urinary tract was normal.

Radium Of the 4 postoperative deaths in the cases treated with radium alone, 1 was due to peritonitis nine days after palliative application to very advanced disease. One was due to "peritonitis" eighteen days after treatment, the patient having convalesced without mishap for ten days. This death probably resulted from an exacerbation of a pelvic inflammation, although the only palpable abnormality of the internal genitalia at operation was an enlarged uterus. One was due to agranulocytic angina eighteen days after radium treatment. This patient received a transfusion of blood before her first treatment because of fairly marked anemia. There was a moderate postoperative febrile reaction, she was discharged on the 6th day, having had no drugs of the amidopyrine type. Seven days later her terminal illness made its onset in the guise of a "cold." The fourth death was due to alleged pulmonary embolism forty days after radium.

Intestinal obstruction resulting in abdominal cramps and vomiting of two days' duration brought another patient to operation one hundred and fourteen days after radium application. A 25-cm loop of necrotic ileum, the constricted apex of which was freshly adherent in the pouch of Douglas, was excised. Because of shock, no anastomosis was attempted. The patient failed to rally and died three days later. A permit for autopsy was not obtained, although cancer was palpably present.

Three patients in this radium-treated group are recorded as having had rectovaginal fistulas terminally. Only 1 of the 30 five-year survivors of this group had significant complications. Double fistulas appeared fifteen months afterward, while the patient was convalescing from an operation for acute strangulation of a loop of ileum in a left femoral hernia, resection being necessary. By the time further surgery seemed advisable she preferred to carry on with her fistulas. She died of cardiovascular disease at the age of seventy, six years and three months after the first treatment. Three other survivors had radium cystitis coming before the third year and lasting one, six and twelve months, respectively, without ensuing ureteral stenosis.

Radium and x-radiation Though there were in the group treated by radium, then x radiation, no immediate or early deaths after treatment, 3 later deaths are to be laid to complications—and further casualties may still eventuate from the combined treatment as given during that period.

The first fatality took place as follows. Four months after a sequence of treatments, namely 3000 mg. hr of radium, 1600 r 2250 mg. hr and 1600 r, dilatation of the cervix was performed for pyometra associated with severe pelvic pain and fever. A month later dilatation of the cervix for presumed recurrent pyometra disclosed a recto-uterocervicovaginal fistula. The pelvic tissues were very indurated. Cancer was not believed to be present since the primary lesion had been described as about 2 mm. in diameter. Death, apparently from chronic sepsis, ensued one year from the first admission. In retrospect it seems that a colostomy would have been salutary. The second patient's inverting disease had palpably involved the left broad ligament when she was first treated by 4800 mg. hr of radium. Because of pain discharge and induration of the broad ligaments, another local application of 3000 mg. hr was given 6 months later followed during the next three months by two series of x-ray treatments of 1600 r each. The patient was admitted for terminal care one year after the first radium treatment, and died of uremia eight months later. Her entire terminal course seemed to be compatible with advancing disease, even to the appearance of double fistulas a few months before death. At autopsy a special effort to find tumor was fruitless. The kidneys showed acute and healed pyelonephritis there was chronic inflammation of the bladder ureters and rectum. The third death from complications took place five years and three months after the first treatment, consisting of 4800 mg. hr. For one year the patient had been well and examinations had disclosed no evidence of recurrence. Then dysuria pain in the left lower abdomen and tender induration on the left felt by rectum (probably due to irradiation and not to recurrence) led to x-radiation, 3200 r in less than one month. By the third post radium year a vesicovaginal fistula was present, the patient being in other respects well, and examination revealing no other palpable abnormality beyond soft pelvic scarring. Five years and seven weeks after the first treatment, examination and biopsy of the cervix and vulva were performed under anesthesia because of one month's vaginal staining and swelling of the vulva which was whitened, thickened and irritated. Ten days after this procedure uremia made its entirely unexpected onset bilateral ureterostomy was of no avail. Autopsy failed to reveal any evidence of recurrent cancer. There were bilateral uterine stenosis with chronic inflammation bilateral chronic pyelitis and chronic pyonephrosis.

Because of these 3 cases, we are alarmed at the possibility that other deaths in this radium and x-ray group may have been due to treatment and not to advancing disease. On the other hand, the follow-ups have been careful, and known complications before terminal courses were well under way were not unreasonably numerous or severe. The following complications were noted proctitis, 2 cases proctitis with resulting stricture, 1 case, rectovaginal fistula, 4 cases, rectovaginal and vesicovaginal fistulas, 3 cases. Since, however, during the last ten years the majority of patients with apparently advanced neoplasms have been referred

elsewhere for terminal care, we may have lost opportunities for prolonging life and decreasing discomfort by colostomy or nephrostomy for intestinal obstruction or ureteral stricture due to tumor or possibly irradiation reaction. In this connection it was surprising to discover how infrequently uremia had been included in death certificates as a terminal event in carcinoma of the cervix—seven times in 394 certificates. This undoubtedly common omission may be easily explained by the fact that the picture of uremia can be so clouded by cancer cachexia, the use of drugs and the presence of fistulas and a laissez-faire attitude.

It was emphasized above that complications among the five-or-more year survivors without cancer in the groups treated by radium alone were infrequent. The survivors in this radium and x ray group, on the other hand, have suffered an undue share of complications. The finding of some of the otherwise unsuspected damage may possibly be laid to more frequent follow up examinations including studies of urinary and intestinal tracts, but on the whole it seems that the increase of complications must be laid to supplementary x radiation. Furthermore, owing to the difficulty and occasional impossibility of discriminating between recurrent disease and irradiation reaction as regards pelvic induration, some of the damage may be laid to unnecessary as well as necessary (based on biopsied recurrence) retreatment with both radium and x rays. We have been chagrined though pleased, to find 3 patients whom we had referred for terminal care between seven and four teen months after first treatment, well at six to seven years. In cases of doubt we had tended to prescribe further irradiation at the risk of considerable destruction of tissues. In general, patients with irradiation reactions look much healthier than their symptoms warrant, whereas those with recurrence look worse than they feel.

Three deaths in this group we have attributed to treatment. Of the 65 patients alive at five years, 25 had a total of sixty-three complications, of which five were or are serious enough to threaten life, namely, a pelvic abscess resulting in obstruction and colostomy, an incarceration of an irradiated loop of sigmoid in the pouch of Douglas, with partial obstruction demanding operative release, and three functionless kidneys due to ureteral stricture. Fourteen patients had irradiation proctitis, which generally makes itself known six to twelve months after first treatment, from which stricture resulted in 4 (in 1 of whom a rectovaginal fistula broke through six years and five months after first treatment) and rectovaginal fistula in 4. In the remainder the rectal irritation was short lived and not disabling. Thirteen pa-

tients had irradiation cystitis severe enough to give symptoms one to over five years after the start of treatment. A vesicovaginal fistula ensued in 2 patients. The cystitis had been severe and persistent in the 3 patients whose ureters became stenosed, resulting in unilateral functionless kidneys. It was symptomatically only temporary in the others. One elderly patient's ilia showed focal bony resorption, pain on walking and limitation of motion, leading to this finding. Nineteen patients had diffuse scarring of the pelvic tissues, which softened somewhat over a period of two or three years. The scarring does not give specific symptoms, but easily misleads one into prescribing further irradiation. Marked reaction of the skin and subcutaneous tissues of the lower abdomen, buttocks and sacrum was present in most, but not all, the survivors who had received 3200 r or more. It took the form of superficial telangiectasis with thickening of the dermis and scarring of the subcutaneous layer almost to actual induration. Occasional severe itching seemed to be the only symptom. Contrary to expectation, incisions into these devitalized tissues healed satisfactorily.

This enumeration of complications is likely to leave the impression that the survivors following radium and supplementary x-radiation are leading a more or less crippled, unhappy existence, but such is not the case. As we follow them we are surprised at their state of general well-being and at their adjustment to such residual disabilities as fistulas and strictures of the rectum. Feeling so well, they are likely only with some difficulty to be persuaded to undergo the discomfort of continued periodic genito-urinary and lower intestinal investigation.

No rectovaginal fistula resulting from irradiation has been cured in this clinic. The few patients on whom operation was attempted preferred fistula to colostomy. Unless rectal strictures from irradiation are really disturbing, we have found it more satisfactory to leave them alone, since the trauma of dilatation gives more discomfort than the lesion itself—and dilatation does not eradicate it. Our few attempts to repair vesicovaginal fistula from irradiation have only ameliorated the

patients who developed complications. Of 13 patients who developed complications, 1 had a total of 4800 mg hr of radium, 1 had 6000 to 10,200 mg hr of radium, 1 had 6000 to 10,200 mg hr of treatment for biopsied recurrent disease, 8 had received retreatment for recurrence. Only one of the patients had received less than 1600 r of x-radiation, and 1 had received 3200 to 7100 r, as follows:

3200 to 4000 r, 9 cases, 4800 r, 10 cases, 5000 to 6000 r, 2 cases, 6000 to 7100 r, 3 cases. That the remaining 40 survivors in this group have thus far failed to suffer troubles worth mentioning, although they had practically similar treatment, including retreatments, emphasizes again the varied and unpredictable responses of tissues to irradiation.

It seems hardly necessary to make a general summary of the complications described throughout this review or to present their percentage incidences. They were obviously frequent, and probably more often due to cancer than to treatment, except among those who had x-radiation. To avoid complications and at the same time treat cervical cancer adequately is beyond our present abilities. Fortunately, suffering from these disabilities is not so great as would be surmised from their description and enumeration. Accepting a pretty high incidence of complications as inevitable, efforts should be made by careful follow-up to discover them early and prevent serious sequelae, for example, untreated ureteral stricture is the most important of the potentially lethal sequelae, intestinal obstruction being the other really serious possibility, once the danger of severe sepsis is past. We make it a rule when giving patients their next appointments to stress that they report at any time should anything new or unusual develop, in the hope thereby of diagnosing early intestinal obstruction or irradiation cystitis which seems to favor ureteral stricture. We have not yet found ureteral damage in any cancer-free patient who had not had cystitis with symptoms.

During the years covered by this report, periodic examination of the urinary tract had not attained the importance it now holds in the follow-up regime. Damage that could have been avoided has been discovered only among the radium and x-ray group of 1929 to 1933. Ureteral strictures are now being found at an earlier stage—and not often, at that—and have thus far been amenable to cystoscopic dilatation.

That supplementary x-radiation was responsible for the improved results shown in Table 5 is indicated by the following. The series is large enough so as not to be weighted favorably by a chance run of cases with a good result. The disease of 32 (49 per cent) of the 65 five-year survivors had been described as having extended beyond the confines of the cervix. On the other hand, of the "radium alone" groups for 1924 to 1928 and 1929 to 1933, 46 per cent and 33 per cent of the five-year survivors' tumors had been described as inoperable, that is, the number of favorable cases was greater, yet not more than 28 per cent of the patients survived five years, as against 42 per cent in this radium and x-ray series. Another point support

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reaction
Hysterectomy
Thirteen patients

ing the value of supplementary x radiation is that 57 (51 per cent of them had been graded as inoperable), or 47 per cent, of the 121 patients of this group who had received a total of at least 3200 r were alive at five years. Furthermore, it may turn out to be significant that thus far only 1 definite late recurrence has developed (at five years and nine months in a patient whose tumor had been originally classed as advanced to the point of fixation [Table 5]), 33 of the 63 patients well at five years having already reached their seventh to tenth year.

Pyometra

Pyometra is more often a complication of the disease than of treatment. Thus 29 patients had this condition at the time treatment was instituted, and 4 of them developed it again following irradiation. Either by coincidence or because of the combined treatment, 8 patients of the radium and x-ray group 1929 to 1933, developed pyometra during or after treatment. Since only 5 of these 37 patients were alive at five years, pyometra would seem to accompany a poor prognosis, despite the fact that it has not incommoded therapeutic measures to any considerable degree. Treatment has been given either immediately on drainage or within a month, without other mishap. It is perhaps significant that the 5 survivors had had x-radiation, no patient with pyometra before 1930 having lived for five years. (Two had had a preoperative pyometra, 1 a postoperative pyometra, and 2 had had both preoperative and postoperative pyometras.)

Clinical Classification and Pathological Grading

The results in sizable series of consecutive cases of cancer are the really important ones from the point of view of comparison and evaluation of treatments. Hence, in the above compilations, consideration of groups separated out on the basis of clinical rating of the extent of the cancers and on the basis of pathological grading of the degree of malignancy has been practically disregarded. After all, clinical classification is at best fraught with uncertainty, since so many patients with apparently early operable tumors fail to survive, whereas an occasional case with seemingly advanced local growth becomes cured. The not infrequent death from distant metastasis in the absence of any evidence of local recurrence indicates that tumors discovered early enough to be cured by operation or irradiation may spread before yielding to therapy—and often enough have operators encountered pelvic metastases at laparotomy for what had been, on thorough preoperative examination, considered operable, even grossly early, cer-

vical cancers. Likewise disappointing have been attempts to separate groups according to the microscopic picture of the tumor. How can one explain on known criteria late recurrences of microscopically highly malignant cancer after surgery, or cures of inoperable but microscopically well-differentiated, hence presumably radioresistant, cervical tumor by radium? The varied and unpredictable responses of patients and their cancers are so constantly observed as to make it obvious that other unknown factors are involved and that palpable and microscopic grading can be of only little help in evaluating therapy.

Operation versus Irradiation

There would seem to be no longer any argument in favor of operation except for microscopic or near microscopic cancers when other pelvic disease, demanding cure for symptomatic or other reasons (for example prolapse, fibroids, ovarian tumors, endometriosis) or rendering irradiation unnecessarily risky (for example active pelvic inflammation), is present—and except for the uncommon operable cancer that is discovered to be radioresistant before the chance for possible surgical cure has passed. When other pelvic disease is present with more advanced cervical cancer, irradiation risks must be accepted and complications met as they evolve. After all, the good results of surgery have been accomplished in selected cases, but without augmenting total salvages in series of consecutive cases beyond a certain point, whereas the employment of radium and then x-radiation has been followed by a progressive improvement in the total salvage among consecutive cases. In answer to the possible suggestion that the improved results of more recent years may be due to increased percentages of favorable cases, the following figures may be given for what they are worth, namely the percentage of tumors in the various groups described as being confined within the limits of the cervix: 1902 to 1913, 13 per cent; 1914 to 1918, 29 per cent; 1919 to 1923, 26 per cent; 1924 to 1928, 28 per cent; 1929 to 1933, 32 per cent. Thus there has been no significant increase in apparently favorable cases, and furthermore by no means all these were among the survivors.

*Carcinoma of the Cervical Stump**

From Tables 1 to 5, inclusive, have been separated out all the cases of stump carcinoma, a total of 40 for the years 1909 to 1933, inclusive, that is 6 per cent of the pathologically confirmable cases first seen or treated during those years. They are

*Three patients of the secondarily seen or treated group had had vaginal hysterectomy elsewhere nine years, six years, and six months, respectively, before the primary therapy. 1 of the 40 unconfirmable cases first seen or treated in this hospital after 1902, the patient had had vaginal hysterectomy here seven years and ten months before the diagnosis of cervical cancer.

summarized in Table 6 There were no cases of stump carcinoma in this series before 1909 That 5 of the 12 patients who had had their hysterectomy at this hospital returned with stump carcinoma within three years deserves comment They all almost certainly had had early and probably discoverable cancer at the time of hysterectomy Three had had neither biopsy nor treatment of the cervix before operation (1917, 1924, 1925), 1 had had biopsy (the specimen does not show any evidence of cancer, multiple biopsies probably would have disclosed new growth) and cauterization preliminary to operation (1927) and eight months before the diagnosis of cancer, and 1 had had cervical cauterization immediately before hysterectomy (1927) and seventeen months before treatment of her endocervical adenocarcinoma This last patient was not saved, although her tumor

need hardly be stressed that patients with retained cervixes should be followed for long periods, and should be warned to report for examination on the slightest of signs, such as staining or discharge Since carcinoma of the cervix occurs predominantly in women who have been pregnant at one time or another, the question arises as to whether it might be safe to allow the cervix to remain in nulligravidas The answer appears to be that such a procedure is not safe, for 10 (23 per cent) of the 44 cases of stump carcinoma covered above were recorded as nulligravidas

Retreatment

Many of the patients of this whole series received retreatment with radium, some with x-rays also, sometime after their original therapy as described above In the great majority the presence of re

TABLE 6 Carcinoma of the cervical stump Summary of treatment and results, 1909 to 1933, inclusive

| PERIOD | NO OF CASES | PER CENT AGE OF TOTAL CASES | HYSTERECTOMY DONE AT HOSPITAL | | | HYSTERECTOMY DONE ELSEWHERE | | | METHOD OF TREATMENT | | | | | | | |
|--------------|-------------|-----------------------------|--|----------------|----------------|--|----------------|----------------|----------------------|------------------|------------------------|------------------|-------------|------------------|------------------|------------------|
| | | | TIME BETWEEN OPERATION AND DIAGNOSIS OF CANCER | | | TIME BETWEEN OPERATION AND DIAGNOSIS OF CANCER | | | VAGINAL CERVICECTOMY | | ABDOMINAL CERVICECTOMY | | RADIUM | | RADIUM AND X RAY | |
| | | | No of cases | Less than 3 yr | More than 5 yr | No of cases | Less than 3 yr | More than 3 yr | No Cases | Alive of at 5 yr | No of Cases | Alive of at 5 yr | No of Cases | Alive of at 5 yr | No of Cases | Alive of at 5 yr |
| 1909 to 1914 | 1 | 2.1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | | | | | |
| 1914 to 1919 | 8 | 10.1 | 3 | 1 | 2 | 5 | 3 | 2 | 0 | | 5† | 2 | 3 | 0 | | |
| 1919 to 1924 | 4 | 3.3 | 1 | 0 | 1 | 3 | 1 | 2 | 0 | | 1 | 0 | 3 | 0 | | |
| 1924 to 1929 | 15* | 6.6 | 6 | 3 | 3 | 9 | 4 | 5 | 0 | | 1 | 1 | 13 | 6 | | |
| 1929 to 1934 | 12 | 4.7 | 2 | 1 | 1 | 10 | 1 | 9 | 1 | 1 | 0 | | 6 | 2 | 5 | 4 |
| Totals | 40 | | 12 | 5 | 7 | 28 | 10 | 18 | 1 | 1 | 7 | 3 | 25 | 8 | 5 | 4 |

*One case was not treated
†One operative death
Of the 28 cases before 1929 6 or 21 per cent are alive at 11 to 20 years of all cases 16 or 40 per cent were alive at 5 years

had been apparently localized to the stump, the others are well more than eleven years after cancer treatment In addition to the above two cauterizations performed before the diagnosis of cancer, there was but one other, among all the cases in this report, and that had been done elsewhere seventeen months before the finding of advanced growth† The occurrence of stump carcinoma in such an appreciable number, and the fact that neither cauterization nor repair has been proved to be really prophylactic, make it impossible to avoid the conclusion that, when feasible, complete instead of supravaginal hysterectomy should be performed, and when neither this nor some form of cervical amputation can be undertaken, every effort should be made to rule out cervical new growth, both by thorough curettage of the canal for biopsy and by multiple biopsies from the glandular-squamous junction If a cervix appears diseased enough to warrant cauterization or conization before supravaginal hysterectomy, the biopsies are all the more important It

†Thirteen of all the cases in this report had had the operation of trachelorhaphy 12 (6 at this hospital) five to twenty years before cancer was diagnosed and 1 (not here) less than two years before the diagnosis.

currence was assumed on the basis of the clinical findings That most of these retreatments were futile was proved by the fatal outcomes It is impossible to show that they had even any palliative influence, or that the few patients who turned out to be survivors had not simply had induration from previous irradiation Retreatment for biopsied recurrence most often fails to be salutary, since usually by the time tumor that can be biopsied appears, hopeless spread has occurred Actually only 7 patients, retreated for biopsied local recurrence, have become five-or-more-year survivors, 2 in the secondarily seen or treated group and 5 in the regular series These recurrences were detected four months to four years after first treatment As seen from the tables, retreatment for recurrence after the fifth year of survival has not prevented death

Late Recurrences

We understand this term to mean recurrences after five years in those clinically well at five years after first therapy Eliminating those patients with obvious recurrence at five years, there are left, to

1929, 106 who were well after that interval. Of these, 6 became untraceable, 9 died of intercurrent disease, 17 died of recurrent cancer of the cervix (recurrence assumed in 14, proved in 3) and 3 were alive at ten years but with the disease. Thus 67 per cent of those apparently well at five years were well at ten years. Eight of the late recurrences were in patients treated surgically (all had had squamous-cell carcinoma), 8 in those treated by radium (1 had had adenocarcinoma) and 4 in those treated by both means (all had had squamous carcinoma).

Multiple Malignancy

In the series are only 6, possibly 7, cases which were proved to have had another type of malignancy in addition to that of the cervix cancer of the endometrium at the same time, cancer of the breast at the same time, melanoma of the choroid, diagnosed four years and four months after treatment of squamous cancer of the cervix, cancer of the vulva, diagnosed seven years after treatment of cancer of the cervix, carcinoma of the sigmoid, diagnosed eight years and eight months after cancer of the cervix treated, carcinoma of the rectum, diagnosed seven years and three months after treatment of the cervical lesion, carcinoma of the lower left vagina and left labium minus, diagnosed five years and ten months after treatment of cervical cancer. Since late recurrences of cancer of the cervix are unlikely to involve the lower vagina or labia without evidence of recurrence higher up we are inclined to believe that the tumor in the last case was a new lesion, although microscopically it is indistinguishable from the original sections of the cervix. We conclude, from the various other malignancies recorded in the death certificates, for example cancer of the breast, and from those reported to us, for example cancer of the bladder, that the occurrence of multiple malignancy in this series was somewhat greater than indicated by the above proved cases.

SUMMARY

Of the 997 consecutive cases with a clinical diagnosis of carcinoma of the uterine cervix, seen or treated at the Free Hospital for Women clinic from May 1, 1876, to January 1, 1934, 69 had had their primary treatment elsewhere and 148 (108 before and 40 after October 1, 1902) cannot now be proved to have had the disease. The body of this report is concerned with the remaining 780 consecutive, previously untreated, pathologically confirmable cases encountered from October 1, 1902, to January 1, 1934.

No significant difference in behavior or response to therapy can be discerned between the

adenocarcinomas and the squamous-cell carcinomas.

The percentages of treated cases alive at five years are as follows: October 1, 1902, to 1913, 12, 1914 to 1918, 21, 1919 to 1923, 24, 1924 to 1928, 29, 1929 to 1933, 38. The percentages of treated cases alive at ten years for the same groups to 1929 are 8, 11, 12 and 21. The percentages of treated cases considered cured, that is alive at twelve years, for the same groups to 1929 are 8, 11, 10 and 12 (thus far, since the total number of twelve year survivors for the 1924-1928 group will not be known until January 1, 1941).

Operative mortalities, deaths from intercurrent disease and the occurrence of other malignant tumors, proved and unproved, are included in the charts and discussion.

Complications of the disease and complications from its treatment are described and enumerated in the running discussion. Before the employment of x radiation it appears that complications were most often due to advancing disease. Emphasis is placed on the relative infrequency of serious complications from radium alone in those patients destined to survive.

The best percentage of five year survivors among unselected cases was achieved by the administration of supplementary 200-kv x-radiation — 42 per cent (Table 5) — at the price of an increased number of complications to which death has been attributed thus far in 3 cases. The adjuvant effect of x radiation is even more apparent in the 121 cases of this same group which received at least 3200 r — 47 per cent were alive at five years.

This study brings out again what has already been emphasized by other writers, namely the necessity, as part of the follow up regime, of periodic investigation of the whole urinary tract in all cases, including those with recurrent cancer and especially in those having irradiation cystitis without evidence of cancer.

Clinical classification and pathological grading are omitted as practically useless in the evaluation of therapy.

Since improved results have been associated, first, with the use of radium in a greater number of cases, and then with the employment of supplementary x radiation, it is reiterated that the indications for surgery in the treatment of cervical carcinoma are becoming very much restricted.

The appreciable incidence of carcinomas of the cervical stump in this series (40, or 5 per cent) and the fact that 23 per cent of them were in patients recorded as nulligravidae, re-emphasize the desirability of removing the cervix, even from those never pregnant, when hysterectomy is undertaken, or, if this is not feasible, of taking multiple

biopsies to rule out early cancer, treating the cervix if treatment is indicated for other reasons, and following the patients for long periods after operation, exhorting them to report for examination at the slightest warning sign

Retreatment given to many patients for recurrence is salutary in but a few

In this series, late recurrences are divided equally between patients treated surgically and those treated by radium, and 67 per cent of those apparently free of disease at five years are found to be well at ten years after primary therapy

Thus far there have been 6 unquestionable cases of multiple malignancy in this series

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DISCUSSION

DR GEORGE C WILKINS, Manchester, New Hampshire. This paper presents the constantly improving results of thirty years of treatment of carcinoma of the cervix. The improvement is due to a study of the previous results, to a better understanding of the disease and especially to a gradually increasing use of radiation

I note that there was a considerable difference in the radiation dosage during the time the method was being established. This is possibly because there were a number of different men who were giving the treatment.

Evidence is presented that radium therapy is not without troublesome sequelae, and of course we must be very alert to recognize this fact and to treat them. It is sometimes difficult to know whether the symptoms that develop one, two, three, four or five years afterward are due to the radiation or to a recurrence of the disease

The lateness of the sequelae is a peculiar characteristic of radium treatment of cancer of the cervix. It is probable that some of the sequelae may be avoided by proper spacing of the intervals between treatments

We have all been waiting for comparable statistics on cases treated by radium and those treated by radium plus x ray, and the authors of this paper have demonstrated the increase in salvage with the use of deep-therapy x ray added to radium. It must be borne in mind, however, that radium is the predominant therapeutic agency in treating cancer of the cervix, as is shown in this paper and others, there has been a salvage with radium alone in different clinics anywhere from 25 to over 30 per cent, but so far as I know, no one with this disease has been cured by x ray alone

I believe in the use of the x-ray first, as was advocated by Dr Healy in Memorial Hospital. The reasons are that x ray therapy covering a period of four or five weeks will clear up a great deal of the growth, particularly if the latter is productive, and will also clear up infection that frequently accompanies the growth. Then, when one is ready to treat the cervix with radium, it has resumed its normal shape or very near it and is clean. Since we have

been using x ray prior to radium, we have found the application of radium an easier procedure

At the Elliot Hospital from 1920 to the present time, we have had 300 cases of carcinoma of the cervix, not including cervical stump cases. From 1920 to 1934 we had 185 cases, all of which were treated by radium alone. The study is almost completed and only 10 of the cases have not yet been traced. If half of these 10 patients are found to be living five years after treatment, we shall have a 35 per cent five year salvage. They have all been treated in the same way and by only two men, Dr Dwinell and myself. We started treating these cases in one way and have continued without change. We give the patient 3500 to 4000 mg hr of radium for the first treatment, on the theory that this is all the patient can stand without a great deal of irritation. Then in three weeks when the irritation has subsided, we give another dose of 1800 to 2000 mg hr. Curiously enough this coincides with the theory later advanced by Coutard of a twenty-one day periodicity of cell susceptibility to radiation.

DR GEORGE M WATERMAN, Providence, Rhode Island. Dr Pemberton and Dr Smith are to be commended on the excellence of and the improvement in their results. Their paper shows conclusively that x ray must be regarded as an essential factor in treatment. I say this not only because of their excellent results, but also because of the results that are being reported from various other clinics in the country. Dr Meigs has recently published some work that showed excellent results from the use of deep x ray. In his series of 106 cases between 1929 and 1933, before the use of x-ray, the percentage of cures was 28. That is a most excellent showing.

At the Rhode Island Hospital since 1926 we have used a method a little different perhaps than that employed in most clinics. We have adopted the interstitial method of radiation, and have made use of interstitial radiation needles. These are long needles of low radium content, and they are used over long periods of time. We have had 308 patients treated by this method. Of these 97 (31 per cent) survived a five year period.

Two years ago we reported our experience with this method. There were 173 cases with 55 survivals (32 per cent). In a recent series of 135 cases we have had 42 survivals (32 per cent). This shows that we have gone about as far as we can in the use of radium alone in the treatment of cancer of the cervix.

We believe that the method we have used is a safe one. Our morbidity and mortality figures have been even a little better than those of Dr Pemberton and Dr Smith's series of cases treated by radium alone, and we have had no more fistulas or late sequelae than are reported by other clinics. Our incidence of fistula runs a little under 8 per cent, which compares favorably with a series published by Ward and Sackett. With improvement in our use of x-ray therapy we hope for generally better results in years to come.

DR JAMES R. MILLER, Hartford, Connecticut. I hope that Dr Pemberton will be able to bring out in his discussion to just what extent improvement has taken place over all these years. When I first started in practice, one out of ten cases would have been considered operable. Now well over half are considered operable. The one important thing in the treatment of cancer, so far as end results are concerned, is the time at which adequate treatment is begun, and that factor vitates all statistics unless it is taken into consideration.

Dr. J. V. MAUGS, Boston Dr. Pemberton and Dr. Smith are to be congratulated on their figures but I believe that a division of the cases into groups, even if only into operable and inoperable, would be a fairer way to make this report. Certainly the cases seen at the Free Hospital for Women are seen earlier than those at the Pondville Hospital. Therefore the total number of survivors must be greater and the percentage better. Fifty early cases are certainly going to do better than 50 late cases so that division into groups is really essential for comparison. If such a division were made, I am sure that the results in this series would be about the same as in others.

I have been interested at the Pondville Hospital in the study of the urological complications of cancer of the cervix. All patients are examined with the cystoscope by the urologist and studied by intravenous pyelography. The cases under treatment are followed very carefully through their treatment, because occasionally there is a flare up of temperature due to changes in the kidney or ureter. Drainage of the ureter and nephrostomy have been necessary on numerous occasions.

Another question I think important is what to do with cases that do not respond to x-ray and radium. If biopsies are taken throughout treatment, certain patients can be found who do not respond to radiation as demonstrated by microscopic examination. I believe that we should operate on these cases. They do not tolerate surgery well and perhaps we ought to obtain more biopsies during roentgen therapy and decide whether or not the patient is going to respond before we give radium. This method, I believe, would lessen the possibility of fistulas.

Salvage and improvement will come from early diagnosis, recognition of kidney lesions and ability to choose those patients who are likely to respond to radiation.

Dr. HERBERT A. DUFFEE, Burlington, Vermont. My discussion has to do with the prophylaxis of carcinoma of the cervix. Whether or not we consider this disease the result of resting tissue or of irritation from erosion destruction of the carcinogenic zone about the external os has in my experience been 100 per cent efficient in preventing this condition. I believe that one of such procedures as simple cauterization of the zone around the external os, coagulation of that same zone, excision with a conizing knife or a Sturmdorf's operation will prevent almost all true carcinomas of the cervix.

I wish to ask whether anyone here knows of a single case in which carcinoma has developed in a cervix that has been treated by one of the four methods that I have enumerated.

Dr. SMITH. I now have records of 4 cases of carcinoma of the cervix after cauterization. The diagnosis in each case was made more than five years afterward. I do not believe that cauterization should be considered a truly prophylactic measure although in general it seems to have some value as such.

Dr. Miller asked whether an increased percentage of early cases might not have accounted for the improved results in the more recent groups. The percentages of early cases in our five groups are as follows: 1902 to 1913, 13; 1914 to 1918, 28; 1919 to 1923, 26; 1924 to 1928, 28; and 1929 to 1933, 32. This is an increase, but is not commensurate with that of the five year survival rate. Furthermore, these so-called early cases were not all among the survivors.

Dr. PEMBERTON (closing). X-ray dosage is still in the experimental stage. We are now trying voltages from 400,000 to 1,000,000 to see whether there will be better results, and especially whether there is less damage to normal tissue with shorter periods of application. We believe that the method of combining radium and x-ray especially as to whether radium needles and seeds should be used with the central application, is of little importance so long as one attempts to apply a uniform amount of radiation to all parts of the pelvis, in order that a lethal dose may reach the tumor wherever it is.

Our results are better and should be better than those in most other series, because we have included all the private cases and they are as a rule, less advanced than the average. This series represents a cross-section of the general population better than does a series from poor people alone.

Urological follow-up is important because the urological complications are often severe.

As regards cancer developing after cauterization of the cervix, it may take five or ten years for it to appear so that a long period of observation is necessary before an opinion can be given.

The essential point is diagnosis of early cases by biopsy. Last year we biopsied 944 cervixes, and found 8 cases of previously unsuspected cancer.

ESOPHAGOBRONCHIAL FISTULA A RESULT OF A FOREIGN BODY*

Report of a Case

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THIS case of esophagobronchial fistula, a consequence of a foreign body, is presented because of the resultant unusual circumstances which developed, and because of the relative infrequency of the condition. An investigation of the available literature does not reveal an entirely similar case. Many cases of fistulous communication between the esophagus and the air passages have been reported, but most of them have been the result of cancer or of congenital factors, tuberculosis or syphilis. The present case deserves a report because it definitely illustrates the possibilities of overlooking a foreign body of this type, especially when x-ray studies and an esophagoscopy are negative.

CASE REPORT

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Physical examination on admission showed an obviously cachectic, markedly dehydrated man. It failed to reveal anything but the objective evidence of dehydration and weight loss. The vital signs were all normal. Blood Kahn and Wassermann tests were negative. The red-cell count was 4,240,000, the white-cell count 12,900, the hemoglobin 15 gm., and the differential polymorphonuclears, 81 per cent, lymphocytes 13 per cent and mononuclears 6 per cent. The urine gave a + test for albumin. The blood nonprotein nitrogen was 21 mg. per 100 cc., and the blood sugar 80 mg.

Examination by x-ray on admission (Fig. 1) was as follows.

The chest is negative. There is no demonstrable foreign body in the esophagus. On the administration of barium there is no delay or obstruction to its passage through the esophagus. Just below the level of the hilus of the lung, however, a thin tongue of barium is seen to project laterally and forward from



FIGURE 1 Anteroposterior Film of the Chest

This was taken on the day of admission, and was reported to be negative. A lateral view was also negative.

the esophagus into the lung, and coincident with this the patient experienced a severe paroxysm of coughing. Films taken after barium fail to reveal any of the medium in the lungs, but do show a small area of increased density just below the left hilus. The findings are those of esophagobronchial fistula.

Esophagoscopy was done. A thorough investigation of the entire esophagus failed to reveal any foreign body, but demonstrated an area of ulceration and inflammation at the level where the left main bronchus crossed the esophagus. Bronchoscopy revealed an area of marked inflammation and ulceration on the floor of the left main bronchus, approximately 15 cm. from the bifurcation. No foreign body was seen.

The patient was gastrostomized under local anesthesia on October 19, 1938. The day following this procedure the temperature rose to 104.5°F, the pulse to 130 and the respirations to 32. The clinical finding, supported by x-ray, was of bronchopneumonia of the right and left

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lungs. There was no evidence by x ray of mediastinal involvement.

Convalescence from this acute phase was without event. The weight on November 10 was 105 pounds. Frequent small feedings with a gastrostomy tube were resorted to, in an endeavor to eliminate the coughing up of gastric contents evidenced, in a small measure, since gastrostomy. Supportive measures, including transfusion, were also employed.

Following complete recovery from the pulmonary infection, Lipiodol was instilled intratracheally and hiling



FIGURE 2. Anteroposterior Film of the Chest

Lipiodol was injected intratracheally with passage of the opaque medium through the fistula into the esophagus. Some of the Lipiodol is in the stomach. There was no evidence of a foreign body.

of the esophagus at a point approximately 2 cm. below the bifurcation of the trachea occurred, further confirming the diagnosis of esophagobronchial fistula (Fig. 2). No foreign body was in evidence.

The patient complained of pain persistently in the region of the lower sternum. Because of this persistent pain and the inability to explain the small area of increased density reported below the left hilus by x ray but without expecting to locate a foreign body esophagoscopy was again done. On re-examination of the esophageal fistula, a very small triangular piece of material was seen protruding from the esophageal wall. This was grasped with a foreign-body forceps and drawn into the esophagus without any tension and removed. It proved to be a bone. The patient's sternal pain immediately disappeared and he was decidedly more comfortable.

Feeding was continued via the gastrostomy for 1 month when esophagoscopy was again done the area of ulcer

tion had disappeared and only slight inflammation was visible. It was learned that the patient had surreptitiously been drinking small amounts of fluid without distress. He was started on small feedings of soft foods and milk without incident. In attempting to take large amounts of water slight irritation occurred, but no coughing. Milk and soft foods caused no distress. The patient was discharged home. He returned in March 1939 at which time bronchoscopy showed a small fistula in the left main bronchus, with no secondary inflammatory reaction. The orifice of the fistula seemed well epithelized, and there was no evidence of the esophageal fistula. Lipiodol introduced intratracheally failed to pass from the left main bronchus to the esophagus.

The patient now carries on his normal activities without any difficulty.

The difficulties presented to the roentgenologist in the determination of the existence of foreign bodies in occasional cases, both in the esophagus and in the lungs, are manifold. In spite of them only a few cases, fortunately, are overlooked. At the time of the initial examination in the case here reported, it is doubtful whether the foreign body had penetrated the esophagus, but this may have occurred without the establishment of the esophagobronchial fistula. At that time no pulmonary symptoms existed. The danger of disregarding the patient's story in spite of negative roentgen findings, no matter how thoroughly or capably done, is evident. The precariousness of giving an unqualified negative opinion with an existing history of foreign body is well known to every competent roentgenologist. In this case the foreign body was not demonstrable in a thorough investigation by x ray on two occasions, although in the second instance a fistula had been established and the patient's general condition was obviously poor. That the bone may have been overlooked when the patient was first examined by esophagoscopy is again a possibility, although the location of the bone at the subsequent procedure does not indicate this. That the patient did not develop mediastinal involvement or succumb to the pulmonary infection, or develop a residual pulmonary complication, is fortunate. The location of the foreign body, invisible in the left main bronchus and with only a small bit protruding into the esophagus, is unusual. The rapidity with which the esophageal end of the fistula closed is of interest.

SUMMARY

An unusual case of esophagobronchial fistula, resulting from the lodging of a bone in the esophagus and subsequent penetration of the left main bronchus, is reported and briefly discussed.

ESOPHAGOBRONCHIAL FISTULA A RESULT OF A FOREIGN BODY*

Report of a Case

JOHN A. MURTAGH, M.D.,† AND M. DAWSON TYSON, M.D.‡

HANOVER, NEW HAMPSHIRE

THIS case of esophagobronchial fistula, a consequence of a foreign body, is presented because of the resultant unusual circumstances which developed, and because of the relative infrequency of the condition. An investigation of the available literature does not reveal an entirely similar case. Many cases of fistulous communication between the esophagus and the air passages have been reported, but most of them have been the result of cancer or of congenital factors, tuberculosis or syphilis. The present case deserves a report because it definitely illustrates the possibilities of overlooking a foreign body of this type, especially when x-ray studies and an esophagoscopy are negative.

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ance of the face is characterized by erythema, papules and pustules. Comedones may be present but do not typify the disease. Increased oiliness may be present but is not constantly so.

Rosacea is frequently associated with blepharitis, conjunctivitis, keratitis and corneal ulcers. The blepharitis is usually a dry scaly, chronic disturbance, occasionally associated with erythema and edema. The other three ocular manifestations are more commonly acute and recurrent. The corneal ulcers may lead to vascularization of the cornea and scarring, and to serious impairment of vision.

One of the outstanding features of the treatment of rosacea, as I see it, is its potent effect in preventing recurrence of conjunctivitis, keratitis and corneal ulcers. The ophthalmologist is best qualified to treat the acute attacks referable to the eye itself. The dermatological program of care has a natural place in aiding the ophthalmologist in the management of the acute attack but it has a more decided effect in preventing recurrences of these ocular attacks. The probable explanation of the favorable effect on the eye of the treatment of rosacea lies, in my opinion, in the fact that the disease and its ocular sequelae are linked together on the basis of a common factor of infection, the numbers of which on the skin are reduced by dermatological care. In other words, rosacea, as well as the associated blepharitis, conjunctivitis, keratitis and corneal ulcers, is probably due to cutaneous infection by *Pityrosporum ovale* (bottle callus of Unna, spore of Malassez) by *Demodex folliculorum* or by some other organism of the nature of a fungus, yeast or perhaps a bacterium.

It is not the purpose of this paper to enter the controversy of what is the precise nature of the factor of infection in rosacea, but merely to express the opinion that the disease behaves clinically like a skin infection and that successful treatment may be outlined accordingly.

Moore, Kile and the Engmans² have made recent studies of the relation between *P. ovale* and seborrheic dermatitis. They succeeded in growing this organism in pure culture from typical cases of the disease. In the scales the fungus was demonstrated in mycological preparations. Injections of a pure culture of this organism into the skins of patients already suffering from the disease produced lesions indistinguishable from seborrheic dermatitis. Inoculations of a pure culture of this fungus into normal-appearing scalps resulted in the development within a week of itching and marked scaliness at the site of the inoculation. Injections made in the same way into the skins of rabbits and guinea pigs produced a dermatitis characterized by scaling and crusting. Pathological studies of areas of experimentally produced dermatitis revealed the presence of *P. ovale*.

If rosacea is merely a manifestation of seborrheic dermatitis, and if *P. ovale* is its cause, one may justifiably speculate in regard to a possible etiologic relation between this organism and rosacea.

Ayres and Anderson³ have studied an association between the presence in the skin of *D. folliculorum* and the occurrence of rosacea. Though admitting the frequent presence of *D. folliculorum* in normal skins, and hence realizing the impossibility of fulfilling Koch's postulates, they believed, nevertheless, that this organism represented an important etiologic factor in certain cases of rosacea. They found moderate to large numbers of *D. folliculorum* in superficial pustules and follicular scales in 50 out of 63 cases examined. All but 3 of their patients in a series of 69 improved or recovered completely following the use of strong antiparasitic ointments and the daily use of soap and water. Ayres and Anderson obtained these excellent results in their first series by the use of an ointment containing Betanaphthol, sulfur and balsam of Peru. In a larger series, later, they obtained equally good results with Danish ointment.

The above lines of observation and reasoning indicate that rosacea is due to infection of the skin. It may, however, be due to lowered resistance to a type of skin infection to which we are all exposed. This lowering of resistance is probably governed by many and varied influences, such as focal infection, lowered gastric acidity, excess of carbohydrates in the diet, nervous and emotional states and other mechanisms which have been studied intimately by Stokes⁴ and his associates. Brilliant and extensive studies of this disease have been made by them, and they have given us much to think about in reference to interpretation and management. The limited scope of this paper does not permit a complete review of Stokes' outstanding contributions. However, a scholarly knowledge of the subject and the ability to treat the disease with the utmost effectiveness would require more than passing familiarity with his work.

Stokes and Beerman⁵ have taken a viewpoint of strong skepticism in reference to the work of Ayres and Anderson concerning rosacea and *D. folliculorum*. They repeated this work and could not substantiate the laboratory data but found sulfur to be of value in treatment. They obtained much improved results, however, by combining sulfur with constitutional treatment.

Regardless of the theoretical considerations and the arguments of these two schools of thought, a spectacularly successful program of care can be organized purely on the basis of rosacea conceived as a type of infection primarily in the scalp but capable of invading eyebrows, eyelids, conjunctiva

and cornea, as well as the central portion of the face and cheeks

Among the best pharmaceutical preparations for local application to the face and scalp are sulfur, ammoniated mercury and yellow oxide of mercury. When used on the scalp these chemicals seem to work better if combined with salicylic acid and *Liquor Carbonis Detergens*. When used on the face, sulfur and ammoniated mercury both seem to behave better if combined with zinc oxide. Yellow oxide of mercury, corrosive sublimate and boric acid are particularly well suited for the eyelids, and one of these three should be so employed as a matter of routine in all cases of rosacea associated with ocular complications. All formulas of value in treating the scalp are generally of equal effectiveness in treating the eyebrows, but are often too strong, if not dangerous, for eyelids, because of proximity to the eyes. All formulas useful in treating blepharitis seem to be of value in treating the eyebrows.

A program of treatment suited to the average case of rosacea and its ocular complications may be outlined according to the scheme indicated below. A high percentage of cases tolerate this program, and about 80 per cent or more recover under it. Patients not tolerating sulfur usually tolerate ammoniated mercury and recover with similar speed. A sample program may be described as follows:

1 The most important step of all is a local application to the face. Sulfur is generally regarded as the best. Walker prefers sulfur lotions, but my experience is that sulfur ointments seem to be very much more effective*. Ayres and Anderson recommend Danish ointment, which is a valuable remedy but is probably more apt to produce dermatitis than are other sulfur mixtures. The following 10 per cent sulfur formula is usually successful:

| | |
|------------------------------|-------------|
| ℞ Sulfur (precipitated) | 3 00 |
| Zinc oxide ointment (U.S.P.) | |
| Aquaphor (Duke) | āā ad 30 00 |

This should be applied each evening to the forehead, cheeks, nose and chin, or merely to the affected areas. In some cases weaker concentrations (5 per cent) are tolerated better, whereas in others it is necessary to employ concentrations as high as 20 or 40 per cent.

If sulfur is not well tolerated, it may be replaced in the same formula with ammoniated mercury in concentration of 5 to 20 per cent. Mercury in this form is very effective.

If the patient tolerates neither sulfur nor am-

moniated mercury, other antiseptic formulas can be attempted, but less favorable results may be anticipated. *Metaphen* (in oil), betanaphthol, *Balsam of Peru* and yellow oxide of mercury are substitutes worth trying.

2 Most dermatologists agree that treatment of the scalp is an essential part of the plan of management in rosacea. At the start an ointment should be used, along with frequent shampoos. Later the ointment may be applied less frequently and gradually replaced by a suitable scalp lotion.

A good scalp ointment is the following formula, devised by Foerster, of Milwaukee:

| | |
|-----------------------------|-------------|
| ℞ Salicylic acid | 2 00 |
| Sulfur (precipitated) | 2 00 |
| Solution of coal tar (N.F.) | 8 00 |
| Aquaphor (Duke) | |
| Lanolin | āā ad 60 00 |

An excellent scalp lotion has been developed by Udo Wile, of Ann Arbor, Michigan:

| | |
|-----------------------|-----------|
| ℞ Mercury bichloride | 0.26 |
| Chloral hydrate | 24 00 |
| Spirit of formic acid | 20 00 |
| Castor oil | 4 00 |
| Menthol | 4 00 |
| Alcohol (80 per cent) | ad 360 00 |

3 Hygienic instructions are generally given in regard to maintenance of cleanliness of combs, brushes, towels, washcloths and pillow slips. (These hygienic measures are logical and seemingly helpful, but my experience is that they are not absolutely essential.)

4 The hands should be kept strictly away from the face. The habit of leaning on the fist or palm of the hand is forbidden. The impulse to scratch, rub, pick at or squeeze lesions is forbidden. These habits may lead to severe factual scarring, and they may interfere seriously with the patient's power of recovery.

5 Other measures of value include oral administration of calcium, hydrochloric acid and vitamin D. Calcium may be taken in the form of the gluconate, a teaspoonful to a half-glass of water thirty minutes before each meal and at bedtime. Dilute hydrochloric acid (U.S.P.) should be taken in doses of 20 to 60 drops in fruit juice or milk, sucked through a glass straw during meals. The effective dose of vitamin D varies between 8000 and 100,000 U.S.P. units. For best results, calcium, hydrochloric acid and vitamin D should all be taken at the same time, thus providing intensive calcium therapy. Both hydrochloric acid and vitamin D have an effect in improving the absorption of calcium. In addition, the administra-

*The use of ointments in treating rosacea is a situation quite in contrast with that encountered in ordinary acne, wherein all greasy preparations must be used in a restricted sense or else avoided entirely.

tion of hydrochloric acid tends to correct the hypochlorhydria often seen in rosacea and other skin diseases. Occasionally, vitamin D alone seems to be very effective treatment.

6. The diet should be restricted in carbohydrates. Excessive eating should be avoided, and food should be masticated slowly. Abstinence from vasomotor foods, drugs and gastric irritants is advised. In regard to the intake of tea, coffee, alcohol and condiments, moderation or abstinence is usually advisable.

VERRUCAE

Warts, though externally located, generally superficial and readily accessible, can be an exasperating disease from the standpoint of both doctor and patient. At a recent meeting of the Academy of Dermatology in Philadelphia, about fifty physicians met in an informal group and discussed warts as a therapeutic problem, and seemed to be in agreement that in many cases the problem is a difficult matter. This resistant group of cases will tax to the limit the therapeutic resourcefulness of even the most versatile specialists.

On the other hand, warts may be regarded as the easiest of diseases to treat. Often enough they disappear spontaneously. Bloch¹¹ was able to cure 44 per cent of cases of common warts and 88 per cent of cases of juvenile warts by suggestion therapy alone. It is certainly true that a high percentage of all types of warts will respond in a predictable period of time to all methods of treatment now in use, especially x-ray therapy and surgical diathermy. One can say with assurance that there is an answer to the wart problem in every case: patience and persistence and repeated application of the best measures will invariably conquer the disease. At the beginning, the patient should be warned of the limitations of our methods of treatment, so that he will not give up in despair in case first attempts fail, yet he should be reassured quite emphatically, so that he will benefit fully from the psychotherapeutic value of the treatment employed.

The types of warts most commonly encountered in practice include verruca vulgaris, verruca plana juvenilis and verruca plantaris. All these varieties are considered to be due to a virus infection, and all respond to the standard forms of treatment with a satisfactory degree of promptness and completeness.

Though warts are due to a transmissible type of infection, the source of the infection causing them in any given case is usually impossible to trace because of the extraordinary latent period, which may be as long as twelve to twenty months.¹⁰

Verruca vulgaris may occur anywhere on the

skin. The appearance is so characteristic and so familiar as scarcely to merit description. In children, particularly between the ages of twelve and fifteen, these warts may be quite numerous, sometimes exceeding a hundred or more. In adults, warts are as a rule less common and much less numerous. The tongue, eyelids, scalp, penis, hands and all other areas of skin may be involved.

Verrucae planae juveniles, otherwise known as flat or juvenile warts, are flesh-colored, slightly raised, flat-topped, rounded or angular papular lesions. They are generally multiple, often quite numerous and are commonly distributed on the face, neck, hands, wrists and knees. They tend to spread in a linear manner along lines of scratch.

Verruca plantaris occurs most commonly at the points of pressure of the ball of the foot. Usually the plantar wart presents a soft, light-brownish core and a hard, calloused rim. This type of wart serves to increase friction at points of pressure, and increases the tendency to callus formation to a considerable extent. It is not uncommon to find a rather small plantar wart surrounded by a very large zone of callous reaction. Plantar warts are undoubtedly contracted from walking on surfaces previously trod by people carrying the disease. Avoidance of the habit of walking barefooted in bedroom and bathroom will prevent many cases. The incidence in gymnasiums and schools can be reduced by careful examination of the feet and appropriate treatment of infected cases, forbidding the patients to use showers and swimming pools until a certificate of cure has been obtained.

There is no prophylactic treatment for warts. The best that can be offered is treatment of each wart as it appears.

The treatment may be directed along many different lines, including internal remedies, injections, local applications, electrodesiccation and radium and x-ray therapy. The virus is probably not limited to the warty area, but undoubtedly inhabits surrounding areas of skin. If a wart is removed by surgery or surgical diathermy, the site may easily be invaded again from the surrounding skin. Autoinoculation in this way takes place more commonly after ordinary surgical procedure than after electrodesiccation. The use of a good antiseptic such as iodine before and after operation tends to reduce recurrences.

As previously mentioned, Bloch advocated treatment by suggestion, and thus cured 88 per cent of juvenile warts and 44 per cent of common warts. Since he succeeded in proving beyond question that warts may be cured by the power of suggestion, he thus provided an explanation for the success

of methods of therapy in common use among the laity, such as rubbing the wart with a piece of raw meat and burying the meat under an apple tree on a moonlight night, rubbing the wart with a cut apple licked with the tongue, and conjuring among Negro healers

This work by Bloch represents a startling contribution. He is an able physician whose integrity is not to be doubted. Space does not permit a complete review of his work, but those who doubt the feasibility of his conclusions are referred to his original paper in German. His experiments were carefully controlled, and they are very convincing.

Bloch's usual method of suggestion therapy consisted of the following procedure. The eyes of the patient are bound and he sits with his hands on an electrically controlled vibrating machine. No electrical currents of any nature enter the body from this apparatus, and possibly the chief power of suggestion lies in the noise made by the machine. A drawing is made of the parts involved and the locations of all warts are marked on it. The warts are painted with a supposedly inert coloring fluid such as saffron, methylene blue or eosin. The blindfold is then removed. It is impressed on the patient that so long as any trace of color is still visible the warts are not to be touched, and that he must be careful about this in washing himself each day. He is then assured that the warts are quite certain to disappear. Other methods of suggestion therapy were employed in occasional cases, and sometimes Bloch relied chiefly on verbal suggestion.

Following Bloch's suggestion treatments, hemorrhages into warts often occurred, and complete disappearance without scarring would then take place in four to eight weeks. Many cases recovered following suggestion therapy after having failed to respond to x-ray, cautery, mercury, arsenic, acids and other ordinary methods. A number of cases successfully treated by suggestion were of many years' duration, and the response to treatment was so prompt as to exclude the possibility of spontaneous recovery.

A phenomenon commonly encountered in treating large numbers of warts consists in the disappearance of all warts after the treatment of only a few. This may be a phenomenon of suggestion therapy, or else the destruction of a few warts may release into the blood stream protein substances that stimulate immunity.

Protiodide of mercury in doses of $\frac{1}{6}$ gr., three times a day, and magnesium sulfate in doses of 10 to 30 gr., three times a day, are among the most popular of the internal remedies. They are usually of a low grade of efficacy. Perhaps they exert

benefit by power of suggestion, as may also be the case with injections and other forms of therapy.

Bismuth employed as an intramuscular injection is used frequently in the treatment of warts. Without doubt, it is efficacious in a modest percentage of cases of common, flat or plantar warts. Practically all forms of antisiphilic therapy, including mercury, neoarsphenamine and sulfarsphenamine, have been reported to be of value.

Electrodesiccation under novocain anesthesia is probably the most effective of all types of treatment for warts. If it is applied skillfully, excellent cosmetic results may be obtained. If warts treated by this method tend to recur, they should be promptly retreated by the same technic. Recurrences following a second treatment are very rare.

X-ray therapy in the treatment of common and plantar warts is usually employed in a dosage of 300 to 1500 r (a few daring therapists employ 2000 to 3000 r in a single dose). Before treatment, the wart is shaved down and shielded with leaded rubber. Within one to three weeks the wart may become a little hypersensitive and slight erythema may be detectable. Disappearance usually takes place within four to eight weeks. If the wart fails to respond, a second treatment, with a dosage dependent on the initial dose and the reaction to it and given by the same technic, is considered permissible. If the second treatment fails, further x-ray therapy is usually contraindicated, particularly if large doses were previously employed. The percentage of cures from x-ray therapy may be increased by the use of two or three applications of bichloroacetic acid during the first four weeks after x-radiation.

The results of radium therapy are about the same as those obtained by x-ray, and the principle of treatment is essentially the same. X-ray is used much more commonly and has tended to supplant radium.

It is appropriate to give a note of warning in regard to the x-ray or radium therapy of plantar warts. The chief contraindication to either form of radiation therapy is a history of previous use of either, even when the interval has been as long as eight or ten years. The serious accidents occasionally seen in the treatment of plantar warts by x-ray are encountered almost invariably when such treatment has been repeated two or more times. No radiation therapy should be given until an accurate record of previous therapy has been made available. Good judgment then employed in regard to total dosage should prevent the disasters that sometimes occur. The factors which enter the estimation of dosage include age of patient, thickness of skin and depth of pigmentation,

degree to which wart is trimmed, and amount of previous dosage as well as reaction to it. Even after using the finest judgment, idiosyncrasy can not be avoided.

In the treatment of flat warts, simple local applications, such as ammoniated mercury, salicylic acid, sulfur and resorcin, are often efficacious. Mercury protiodide given by mouth is in common use, and bismuth injections represent a valuable form of therapy. One of the most effective methods consists of touching each visible wart lightly with a desiccating needle, repeating the procedure about once weekly, and following each treatment with a small dose of x-ray (35 to 75 r) to the affected areas — not to each wart.

In the treatment of warts the dermatologist occasionally encounters patients who refuse or should not have x-ray or radium therapy and who, for reasons of convenience, object to a minor operation with surgical diathermy. These cases are best handled by the use of acids, such as bichloroacetic. If this is applied skillfully, large numbers of warts may be treated painlessly and successfully in a few visits. This method, however, gives a lower percentage of cures than does x-ray therapy or surgical diathermy, and the degree of destruction is more difficult to control, keloidal scars occasionally result.

ALOPECIA AREATA

Alopecia areata is a disease that bears an ominous prognosis, not fully deserved. This bad reputation is derived from those rather exceptional cases which fail to respond to any form of treatment, and go from bad to worse despite heroic efforts on the part of both doctor and patient. It is far closer to the truth to state that most patients recover either spontaneously without treatment or coincidentally with treatment. Every dermatologist probably sees in his career scores of cases with complete recovery while under observation.

In regard to prognosis, Walker and Percival¹ stated "The prognosis is good. If a patient is under forty, the physician may confidently predict recovery. The exceptions are so few that he may cheerfully take the risk of them. Even in those cases where every hair on the body has disappeared, dogged perseverance in treatment is usually rewarded."

As a rule, the diagnosis of alopecia areata is readily established on the basis of simple inspection of the skin. The characteristic appearance is that of a sharply circumscribed patch of complete alopecia, associated with no inflammatory changes. The bald area is smooth and glossy, and essentially normal except for the absence of hairs. At the margin of these patches there are loose,

broken-off hairs, which show on removal an attenuation of the bulb, resulting in an appearance which has given rise to the term "exclamation point hair." These patches may coalesce to form a wide variety of patterns, and may extend until every hair on the body has disappeared.

Rarely, alopecia areata involves the bearded area of the face and spares the scalp. In these cases the diagnosis is not so readily established and is often missed.

Alopecia areata must be carefully distinguished from the patchy alopecia of early syphilis, ring worm, lupus erythematosus, alopecia seborrhoica of the patchy type and pseudopelade. The differentiation is easy except in the case of syphilis. Routine Wassermann, Hinton and Kahn tests are indicated. All three should be done.

The true etiology of alopecia areata is unknown. There is evidence of a transmissible factor of infection. Bowen² reported an epidemic in a girls' home where, after the introduction of a case, 63 out of 69 girls were affected. Two or more cases may occur in a single family. Thun, Sabouraud and many other workers thought they were able to isolate micro-organisms of etiologic importance. The most convincing evidence regarding communicability, however, comes from the numerous authentic reports of epidemics.³⁻⁵ Of interest are the toxic and neuropathic theories of etiology.

Every case of alopecia areata should undergo the traditional studies, including general medical examination, routine blood and urine tests, search for foci of infection and a determination of the basal metabolism. The basal metabolic rate is often lowered, and if so, thyroid medication should be given as a part of the general program of care. In other respects, also, the treatment should be guided by and based on general medical investigations.

In many cases the outstanding clinical findings are evidences of severe nervous and emotional stress and strain. Often these nervous and emotional components are beyond the influence of ordinary medical care. Recovery may take place under treatment by physical and chemical agents, despite the absence or failure of psychotherapy.

In my experience, most of the cases with only one to three or four patches of alopecia areata of the scalp clear up completely within three months on a program including general medical care, all the vitamins in large doses, a diet high in sulfur and other minerals but restricted in carbohydrates, daily applications of an ointment containing oil of cade, sulfur and salicylic acid, and ultra violet light in large doses administered every week or two.

A valuable prescription is the following

| | |
|----------------------------|----------|
| R _x Oil of cade | 12 00 |
| Sulfur (precipitated) | 6 00 |
| Salicylic acid | 3 00 |
| Rose water ointment | ad 60 00 |

The above ointment may be applied daily to the bald areas

Cases of alopecia areata of more widespread distribution are as a rule more difficult to treat, more unpredictable and more given to recurrences

Other recommended forms of treatment include iron, arsenic, pilocarpin by mouth and stimulating and antiparasitic local applications, such as resorcin, turpentine, cantharides, phenol, tar, iodine, sulfur and mercurials

An excellent scalp lotion for use in alopecia areata is the following

| | |
|-------------------------|-----------|
| R _x Phenol | 4 00 |
| Tincture of cantharides | 15 00 |
| Castor oil | 4 00 |
| Alcohol (95 per cent) | ad 120 00 |

This may be applied with friction to the affected areas once or twice daily

ALOPECIA SEBORRHOICA

The common seborrheic type of alopecia is a prevalent source of anxiety and distress to large numbers of men and to a lesser number of women. The response to treatment in young women is usually gratifying, but no reputable dermatologist will make extravagant claims as to what may be accomplished in men of any age. In treating the disorder in men, there is general agreement that much can be done to retard the rate of hair loss, particularly if it is associated with considerable evidence of seborrheic dermatitis. Men showing alopecia without anything more than a slight detectable scaling type of seborrheic dermatitis probably have important etiologic influences of the nature of nervous and glandular disorders. It is quite clear that, at the present time, the methods of ameliorating the neurogenous and endocrinological factors are not sufficiently effective to permit any convincing accomplishments so far as hair growth is concerned. Cases showing the common frontal, bitemporal and vertical types of baldness with little or no evidence of seborrheic dermatitis may be interpreted as having the idiopathic type, and they have a less favorable prognosis than those with the clear-cut seborrheic type.

In spite of the differences between the idiopathic and the seborrheic types of alopecia, the treatment of both is about the same, and is based on the technic and principle involved in the treatment of seborrheic dermatitis of the scalp. The lotions

and ointments useful in treating seborrheic dermatitis are also useful in treating cases of alopecia of the common type (see section on rosacea). There is evidence that vitamin A is of value to hair growth and that vitamin D may be effective in treating seborrheic dermatitis. Hence, any rich source of these vitamins, such as cod-liver oil or haliver oil, has a theoretical as well as a time honored place in the general program of care. The diet should be rich in sulfur, as provided by eggs and meat, and rich in all other minerals, as provided by milk. Fruits, vegetables, meat, eggs and milk should be taken in liberal amounts, but moderate reduction of sweet, starchy and fatty foods is indicated. Instructions regarding cleanliness of combs, brushes and hatbands, and barber shop precautions, are given. Ultra-violet light therapy every week or two in sufficient amounts to sunburn the scalp seems to hasten the disappearance of inflammatory changes, occasionally stimulates slight degrees of regrowth of hair in men, and seems to be immensely effective in stimulating regrowth in young women.

The use of scalp exercises and massage has a place in the management of the common type of baldness, but is not recommended until all evidence of inflammatory disturbances has been eradicated.

In regard to the part played by covering the scalp with a hat, writers have called attention to the following effects: exclusion of air and sun shine, pressure on and partial occlusion of the vascular network supplying the scalp and hypersecretion of sweat. These effects represent only one part of the general etiologic interplay, but in spite of the reasonableness of considering hat wearing a cause of baldness, it must be acknowledged that discarding the hat seems to have no very clear-cut influence on hair growth.

Recent work concerning the use of the male sex hormone in treating various types of genital hypoplasia proves beyond doubt the ability of this hormone to stimulate hair growth in regions such as the face, axilla, chest, pubis and extremities.¹ It is well known that in patients with Fröhlich's syndrome, eunuchs and other types of hypogonadism there may be abundant growth of hair on the head with scant growth on the bearded areas of the face, chest and pubis. It is a well-established fact that extreme degrees of the common type of hair loss may be associated with abundant hair growth on the face, chest and pubis. One of my patients observed sudden onset of baldness of the scalp coincident with great increase of hair growth on the chest and pubic area. These observations would lead one to conclude that the mechanism of hair growth on the scalp is regulated by influences quite different from those at work in other

regions of the body. Certainly the common type of alopecia is usually associated with ample evidence of sufficient secretion of the male sex hormone. In myxedema, the hair of the head and elsewhere is dry, brittle and sparse. Its growth is retarded and it tends to fall out. Haircuts are necessary only at very long intervals. The scalp is dry and scaly.¹²

These thoughts would lead one to suspect that hair loss of the common type may have, at least in part, a glandular basis. Perhaps the pattern is an increased output of male sex hormone and a reduced output of thyroxine. At any rate, the glandular mechanism remains unknown and no therapy on this basis is available. Administered to the skin in ointment form, the male sex hormone is absorbed into the blood stream and exerts a general physiologic action, along with intensive action on the tissues locally. I have employed testosterone propionate ointment locally to the scalp in several cases of the common type of alopecia after clearing up the element of seborrheic dermatitis. In these cases, the total period of treatment has not been sufficient to warrant conclusions as to its efficacy. No effects in either retarding or accelerat-

ing hair growth have been observed. The use of testosterone propionate is merely suggested as an endocrine approach deserving further clinical investigation.

270 Commonwealth Avenue.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26121

PRESENTATION OF CASE

A seventy-four-year-old housewife was admitted to the hospital complaining of jaundice.

The patient had enjoyed good health until eleven months before admission when she had developed painless jaundice, clay-colored stools, dark urine and intense pruritus. These symptoms fluctuated in intensity but never completely disappeared. A few normally dark stools were passed, but at no time did she experience any real nausea, vomiting, pain, chills or known fever.

Throughout this eleven-month period she had a good appetite, ate well of fruits, vegetables, milk, eggs and carbohydrates. Her diet consisted of little meat, however, and she eschewed fats and butter on her doctor's orders. She had lost 40 pounds, and weighed only 128 pounds on entry.

For two months before admission she was mildly constipated, receiving relief by taking cathartics (Epsom salts) every third day. Two weeks before entry she had a transient attack of indigestion and regurgitated a small amount of recently ingested food, but there were no other symptoms.

The patient had been under constant medical attention during the present illness. She had been placed in an outside hospital for a short interval, nine months before admission, where all studies done were reported as "negative." No special diagnostic procedures were performed since that time. She remained at home cooking and caring for one of her seven children until she was admitted.

The remaining family, marital and past histories were non-contributory.

Physical examination revealed a remarkably well-preserved, cheerful, co-operative woman, who had dry jaundiced skin. She showed evidence of weight loss, but was in no discomfort. The peripheral blood vessels were "markedly sclerotic." The apex of the heart was percussed at the midclavicular line in the fifth interspace. A precordial systolic murmur was best heard at the apex, and the blood pressure was 170 systolic, 82 diastolic. The lungs were normal. The abdomen was soft and lax, without evidence of ascites. The liver edge was not felt. A questionable, ill-defined, non-

tender mass was palpated in the right upper quadrant. The remainder of the physical examination was essentially negative.

The temperature, pulse, and respirations were normal.

Examination of the blood showed a red-cell count of 4,130,000 with 11.5 gm of hemoglobin (photoelectric-cell technic), and a white-cell count of 9100 with 81 per cent polymorphonuclears, the stained smear was negative. The urine showed a specific gravity of 1.008, with no albumin, sugar or bile. The sediment contained a rare red blood cell, 8 white blood cells and 20 epithelial cells per high-power field. The icteric index was 60, and the van den Bergh 8.8 mg per 100 cc., with a biphasic reaction. The serum nonprotein nitrogen was 23 mg per 100 cc. Four stool examinations were both guaiac and bile negative.

Roentgenograms of the gall bladder (Graham method) showed that it was not visible after the patient took the dye. The interpretation was rendered difficult by the presence of gas shadows in the large bowel, but the test was believed to be positive.

On the fifth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. HENRY H. FAXON: The history states that the urine showed no bile. Is that correct?

DR. TRACY B. MALLORY: Two urine examinations were bile negative.

DR. FAXON: That is confusing in the light of the other laboratory data.

The story comes down to that of a seventy-four-year-old woman in whom jaundice was the outstanding, and only complaint that we have to consider seriously. The nonprotein nitrogen, blood count and so forth were not remarkable. So far as the gastrointestinal tract goes, there are only two minor points mentioned. One is the fact that on one occasion she regurgitated food. It does not say whether there was any blood in the vomitus, nor whether it contained bile. The other reference is to the large bowel, it was noted she had increasing constipation. Some increase in constipation might be expected in the absence of bile in the intestinal tract. It is of significance that the stool examinations were guaiac negative.

It is important to establish whether or not hers was a true obstructive jaundice, but the presence of an increased icteric index, a positive van den Bergh test and clay-colored stools seems to me to establish this fact definitely.

What then are the factors we might consider that could have caused the jaundice of which she complained? I do not believe it is a jaundice of the

hemolytic type, because of the age of the patient and the absence of any history or findings of infection. There is another possibility—that of cirrhosis of the liver or intrahepatic disease. The liver was not enlarged, no spleen was felt and she had no ascites, hence it would seem that this possibility could likewise be excluded. The third possibility is that of gallstones. Gallstones, as an incidental finding, are very common in elderly people at postmortem examination. However it is my impression that it is not common to find silent gallstones giving rise to abnormal signs with out some antecedent story of at least mild biliary complaints. It would be unusual, but not impossible, without an antecedent story to find a patient with a stone in the common duct. The gall bladder x-ray studies are of very little help to us. Apparently the Graham test was positive, but the report is evasive in stating that the interpretation was rendered difficult by the presence of a gas shadow. Another dubious point in relation to the gall bladder that leaves us in some doubt is that the physical examination states that a questionable ill-defined mass was palpated. In a woman who had lost so much weight and with an abdomen noted as soft and lax, I should have expected that were she to have an enlarged gall bladder the examiner would have made it out without the doubt that is here expressed.

The last possibility as a cause for the jaundice is cancer, and with this consideration one is faced with the problem of whether or not it was a metastatic or primary manifestation. I think it is unlikely, with the story of no enlargement of the liver, that the steady increase in jaundice would arise from metastatic disease unless the metastasis happened to be in such a strategic position that it blocked the common bile duct. Primary cancer in the region of the bile duct, the head of the pancreas or the ampulla of the duodenum could cause biliary obstruction and jaundice, and it seems to me that the absence of pain and the progressive nature of the jaundice—although there were intermittent spells where she did get some bile through into the large bowel—indicate that she may well have had cancer of the head of the pancreas or common bile duct. If you look at the story as a whole the course is a steadily progressive affair, despite the transient periods of improvement. To be able to say whether the primary cancer was in the head of the pancreas or in the bile ducts, is almost impossible. If I assume that the questionable mass was an enlarged gall bladder, cancer would fit in with the old dictum of Courvoisier's law, namely, that the development of jaundice with cancer gives a large

gall bladder, whereas if stones are responsible the gall bladder is not distended.

I have deliberately and perhaps very unwisely skipped over the feature of absence of bile in the urine. I rather upbraid myself for having asked at the opening of the discussion if this finding was correct, for I was sure there was going to be some bile in the urine. It is confusing to find that at two examinations this was not present. I suspect that the surgeon when he explored this case was in some doubt as to the nature of the lesion. It is my impression he feared he might encounter cancer but hoped he would find a solitary stone to explain the jaundice. My first diagnosis is cancer of the head of the pancreas or bile ducts, and my second choice, an obstructive gallstone.

DR. MALLORY: Does anyone else care to hazard an opinion?

DR. FAXON: Would someone like to explain to me the absence of bile in the urine, in the presence of the story and chemical findings that are given here.

DR. JOHN STEWART: My guess would be that it was an erroneous observation.

DR. FAXON: One determination might be erroneous, but the two reports bother me.

DR. STEWART: The foam test is certainly open to differences in interpretation by various observers.

DR. MALLORY: It may have been observed by artificial light.

DR. J. H. MEANS: I might mention a case that bears out what Dr. Faxon has said about intermittent obstruction in cancer of the head of the pancreas. We had a patient who had a clinical story of stone, with intermittent jaundice. He got over it and then had a recurrence of the jaundice. He was young and we thought that cancer was out of the question. He was explored and cancer of the head of the pancreas was found.

DR. LANGDON PARSONS: In spite of the fact that this patient had lost 40 pounds, she felt perfectly well and was admitted to the hospital simply for relief of the itching from her jaundice of eleven months' duration. In our line of reasoning we followed much the same train of thought that Dr. Faxon has. I was helped enormously by Dr. Stewart, who had made observations, on the basis of vitamin K and liver function studies, relative to determining whether we were dealing with carcinoma of the head of the pancreas or with obstructing gallstones. I think he might be asked to comment.

DR. STEWART: It may be of interest to tell you a little about the prothrombin values in this case, as determined by the method of Warner, Brink

hous and Smith A level such as this woman had when she entered, namely 72 per cent of normal, is rarely or never seen in jaundice due to carcinomatous obstruction, presumably due to the fact that as a rule with obstruction due to carcinoma there is little or no escape of bile salts into the gastrointestinal tract, hence no decrease in absorption of vitamin K. This determination is definitely of some help in diagnosis, particularly when it is a question of deciding between carcinomatous obstruction of the bile duct or obstruction due to stone. Patients with obstruction due to stone show levels in general from 15 to 20 per cent higher than do patients with obstruction due to carcinoma. On the other hand, the determination is of no particular value in differentiating intrahepatic disease, so-called catarrhal jaundice, from jaundice due to stone in the common duct, but in this particular case the finding of 72 per cent, coupled with the other elements in the clinical picture, made us more optimistic about the diagnosis than Dr Faxon was.

PREOPERATIVE DIAGNOSES

Choledocholithiasis
Carcinoma of gall bladder?

DR. FAXON'S DIAGNOSIS

Carcinoma obstructing the common duct?
Choledocholithiasis?

ANATOMICAL DIAGNOSIS

Choledocholithiasis

DR. PARSONS She had a small sclerotic gall bladder, not much bigger than my thumb, and a dilated common duct with a stone measuring 3 cm in diameter impacted in the duct at the papilla. Nothing was done to the gall bladder. The common duct was drained, and she made a perfectly good recovery.

PATHOLOGICAL DISCUSSION

DR. MALLORY I can add nothing to what has already been said. The essential thing in any case of this sort is not to allow one's pessimism to prevent exploration.

CASE 26122

PRESENTATION OF CASE

A sixty-nine-year-old unmarried woman was admitted to the hospital complaining of indigestion.

She had first been seen by a physician eleven days before entry at the request of her landlady and much against the patient's will. At this time

the patient was quite weak and unco-operative so that no well-defined story of her illness could be obtained. As near as could be determined she had been suffering from indigestion over a period of twelve or fifteen years. The landlady stated that during the three years preceding the initial examination she had eaten most of her meals in her room and had complained bitterly about the food regardless of its quality. She had retired from teaching five months before entry and since that time had failed rapidly and hardly ever left her room. She had lost considerable weight, and for three weeks had been confined to bed because of profound weakness. For some time she had regurgitated everything ingested. At the time of her first examination the regurgitated material was *coffee colored and contained small particles of undigested food*, it was later discovered that she had drunk coffee a short time before. She coughed frequently and raised considerable sputum, but it was impossible to determine how long this had been going on. She insisted that there was no pain or tenderness anywhere. Bowel movements had always been more or less costive.

Physical examination by the physician who had been called showed her to be extremely emaciated, weighing about 80 pounds. She stated that her usual weight had been 125 to 130 pounds. The patient was very unco-operative, unreasonable and abusive in her language. There was well marked arcus senilis. Oral hygiene was poor. There was no engorgement or visible pulsation of the neck veins. The heart was normal in size and shape, and the sounds were of good quality, there were no murmurs. The blood pressure was 90 systolic, 65 diastolic. The breath sounds showed diminished intensity throughout both lungs, but percussion was normal and no rales were heard. The abdomen was soft and doughy. There was no tenderness, and no masses could be felt. Pulsations of the aorta were easily detected. There was no peripheral edema. The skin was dry and flabby, and there was evidence of considerable weight loss. Hospitalization was advised immediately, but the patient refused. Her condition continued unchanged during the succeeding ten days up to entry. For two or three weeks prior to her admission she was unable to take any solid food, and much of the liquid ingested was regurgitated.

Examination at entry was unsatisfactory, but the findings were essentially those of the previous examination except that many scattered coarse rales and rhonchi were audible throughout both sides of the chest. One examiner felt a mass in the umbilical region about the size of an orange, which appeared to be fixed and moderate

ly firm but not tender This was not corroborated by others.

The temperature was 101.0°F, the pulse 110, and the respirations 24

Examination of the urine showed a specific gravity of 1.022, with a slight trace of albumin The sediment contained large numbers of white blood cells and a rare red blood cell The blood showed a red-cell count of 4,500,000, with a hemoglobin of 80 per cent. The white-cell count was 11,300 with 90 per cent polymorphonuclears The sputum was purulent and contained tubercle bacilli A stool examination was negative.

X-ray examination of the chest showed diffuse hazy mottled dullness involving the upper two thirds of the lung fields. Within the dullness in the left upper lobe there were several large areas of rarefaction having the appearance of cavities A gastrointestinal series showed marked dilatation of the entire esophagus, and during the fifteen minutes of fluoroscopic observation only a trace of barium entered the stomach This was insufficient for satisfactory examination, but there did appear to be considerable irregularity of the fundus and separation of the fundus from the dome of the diaphragm

The patient became considerably weaker, and her condition progressively worse. Four days after study another chest film confirmed the previous findings and in addition demonstrated round shadows at the bases. Her condition was steadily downhill, the temperature fluctuated between 97.0 and 101.0°F and the pulse between 80 and 120 He died on the fourteenth hospital day

DIFFERENTIAL DIAGNOSIS

DR. THOMAS V. URBY Certain aspects of this case seem rather obvious, and others less apparent First of all, I believe that this patient must have been suffering from cerebral arteriosclerosis, as witnessed by her lack of co-operation, unreasonableness and abusive language. Her bitter complaint about food, regardless of the quality, was doubtless at least in part on this basis, and we would like to believe that this was also the reason for her refusal to seek medical aid until she had become very weak.

The patient had tubercle bacilli in her sputum, and the x-ray description of her chest is certainly consistent with advanced pulmonary tuberculosis This diagnosis alone could well account for progressive weakness and loss of weight as well as chronic indigestion over a period of twelve to fifteen years. However, pulmonary tuberculosis would not cause the more recent symptom of regurgitation of food or, of course, the gastrointestinal

x-ray findings. It becomes necessary to make a further diagnosis of a lesion of the upper gastrointestinal tract, which had produced a marked dilatation of the esophagus as well as a deformity in the region of the fundus of the stomach. Marked dilatation occurs only in long standing lesions, such as cardiospasm, which is by all odds its commonest cause. Unfortunately, simple cardiospasm does not explain the picture in the fundus. Also, had cardiospasm been present all these years we should expect an earlier onset of regurgitation. Carcinoma of the fundus would explain the considerable irregularity seen in the x-ray films, as well as the five months rapid downhill course and the coffee grounds vomitus. But there are several inconsistencies. First of all, the dilatation of the esophagus was much more marked than is usually seen in carcinomatous obstruction. There was no anemia, though dehydration may make the red-cell count apparently higher than it really is. The guaiac test on the stool was negative, though it was, of course, only a single examination. Apparently there was not the increased constipation that we usually see in cancer of the stomach. Moreover, we should seriously consider tuberculosis of the stomach. It is well known that it occurs in the fundus, and that it can be a long-standing affair. It could not only explain the years of symptoms, but also the marked dilatation of the esophagus in the absence of true cardiospasm. The lack of anemia and the negative guaiac tests on the stools are probably more consistent with this diagnosis than with cancer.

Tuberculosis of the stomach may be of the sclerosing type, the ulcerative type or the hyperplastic type. The ulcerative type is the one most commonly found in the fundus. It is usually accompanied by involvement of the peritoneum and the regional lymph nodes, a fact that would not only explain the hard mass between the fundus and the diaphragm, but also give a reasonable cause for stricture of the lower end of the esophagus. This type of tuberculosis would seem to me, then, to be the most likely gastric lesion, though a hyperplastic tuberculous lesion should also be considered.

One or two other diagnoses suggest themselves. Extreme weakness and a low blood pressure with known tuberculosis raise the question of involvement of the adrenal glands. I cannot rule out this possibility, but there is insufficient clinical data for a diagnosis. The weakness, after all, could be explained on the basis of the pulmonary and gastric infections. The blood pressure, though low, is not so low as that usually seen in Addison's disease. There is no mention of pigmentation

We may conjecture about the mass in the umbilical region felt by one examiner. It could represent tuberculosis involving lymph nodes, peritoneum or intestines, or all three.

Finally, the many scattered coarse rales and rhonchi heard at the time of admission and the round shadows at the lung bases four days later suggest the aspiration of food and subsequent aspiration pneumonia, secondary to the obstruction of the esophagus.

CLINICAL DIAGNOSES

Carcinoma of the stomach
Pulmonary tuberculosis

DR URMY'S DIAGNOSES

Cerebral arteriosclerosis
Chronic pulmonary tuberculosis
Tuberculous ulcer of the fundus of the stomach,
with regional involvement of the peritoneum
and lymph nodes and secondary dilatation
of the esophagus
Aspiration pneumonia

ANATOMICAL DIAGNOSES

Pulmonary tuberculosis, advanced
Tuberculosis of bronchial lymph nodes
Pulmonary embolism and infarction
Bronchopneumonia
Cardiospasm
Pleuritis, chronic, fibrous
Arteriosclerosis, moderate, coronary, renal and
aortic.

Emaciation
Operative scar thyroidectomy

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY. An accurate and detailed history is always the most important part of any differential diagnosis, and when this is impossible to obtain, as in the case of the present irritable and unco-operative patient, one is at a grave disadvantage. Like the clinicians who took care of her in the hospital, Dr Urmey sought an organic lesion to explain her symptoms suggesting a tuberculous ulcer whereas they had thought of carcinoma. No organic lesion of the esophagus or stomach was found, however. The esophagus was quite dilated, measuring 4 cm in diameter, and its walls were markedly thickened, averaging about 5 mm. The cardiac orifice was constricted but could, nevertheless, be dilated. There was no ulceration or any suggestion of tumor. Sections through the wall of the esophagus showed a moderate degree of displacement of muscle fibers by connective tissue and some inflammatory infiltration. These are the usual postmortem findings of a case of cardiospasm. It is very probable that her entire fifteen years of "indigestion" was due to functional obstruction of the esophagus.

The lungs showed a very advanced, progressive tuberculosis with many foci of caseation and of calcification. A surprising finding was a fairly large pulmonary embolus, which completely obstructed the artery to the right lower lobe. All the other organs were small and atrophic in proportion to her severe emaciation.

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OLD MEN PLANT TREES

ATTENTION is particularly drawn to the article by Mr Lowell, which appears in this issue of the *Journal*. Considering the demands that are now being made on all aspirants for an opportunity to practice medicine, this sane and unemotional estimate of the educational possibilities of the average medical student and of the physical and mental attributes of the practicing physician must appeal to all those doctors who are not blinded by prejudices engendered because of the lack of breadth of view inherent in their jobs. The author, his distinguished educational background and his wide humanity, all preclude the possibility of serious dispute of his remarks by anyone other than his intellectual equal. It is a masterpiece of understatement to say that such a requirement will

materially limit the scope of any debate. Let each doctor, whether a practitioner or a teacher, answer as well as he can the questions propounded by Mr Lowell, and then re-evaluate his own contributions to the care of patients and the teaching of medical students. Then he will no longer be impressed by how much he knows and how much the student should learn, but rather by how much he has failed to grasp and by the good fortune that makes students physiologically incapable of remembering more than a small part of what is taught them until such time as they are able themselves to winnow the wheat from the chaff.

HOME CANNED FOOD

WITH the rising cost of foodstuffs and the emphasis on conservation of foods that inevitably accompanies war, there will undoubtedly be an increase in the practice of home canning. This widespread and economical procedure is one that is none the less fraught with a certain amount of danger. No kitchen is equipped with the apparatus for sterilization and control of the packing processes to the extent that commercial establishments are. In foods canned commercially under the present requirements the danger of botulism is virtually nil. In home-canned foods, on the other hand, botulism is somewhat of a problem even now.

Clostridium botulinum is a widespread organism and owing to its anaerobic nature grows in air-tight containers. The spores of the bacillus are resistant to heat, and unless a high temperature is maintained over a sufficient period of time to kill them, the organism will begin to grow in the canned food and elaborate toxin.

There have been over two hundred sporadic outbreaks of botulism in this country, most of these have occurred on the West coast, although practically every state has had them. In most instances the infection has come from canned vegetables, rarely from meat products. This may be due to the greater frequency of vegetable canning in the home. Non acid foods, such as beans, are more dangerous than tomatoes or other acid vegetables.

In Europe most of the outbreaks have been traced to contaminated sausage. Fortunately, although the spores are resistant to heat, the toxin itself is easily destroyed.

Two procedures can be recommended for the prevention of botulism. The first is to destroy all cans of food that show evidence of bulging or which are noted to contain gas bubbles or on opening have a rancid odor or slushy appearance. Secondly, all home-canned vegetables should be thoroughly heated to boiling before use. These precautions are so simple and so easily carried out that there can be virtually no excuse for the occurrence of this disease.

MEDICAL EPONYM

BILHARZIASIS

The first description of the clinical picture of this infestation appears in an article by Dr. Theodor Bilharz (1825-1862), then resident in Cairo, in the *Wiener medizinische Wochenschrift* (6:49-52 and 65-68, 1856), entitled "Distomum haematobium und sein Verhältniss zu gewissen pathologischen Veränderungen der menschlichen Harnorgane [*Distomum haematobium* and Its Relation to Certain Pathologic Changes in the Human Urinary Organs]." A previous article, chiefly of zoological and anatomical interest, had appeared in the *Zeitschrift für wissenschaftliche Zoologie* (4:52, 1852-53). The translation of a portion of the article is as follows:

The symptoms of the disease which is always chronic in nature, as will be shown, are partly the well known one of catarrh of the bladder, partly peculiar and indicative of the presence of *Distomum haematobium*—a persistent sensation of pressure and heaviness in the hypogastric region—at times violent burning or colicky pain—tenderness in the bladder region—frequency of micturition—hematuria, usually small in amount, but persistent and frequently recurrent—admixture of mucus in the urine. The catheter often meets with rough areas which may be confused with urinary calculi, but which may easily be distinguished by their immobility and soft consistency. It is often possible by simultaneous rectal examination to feel these areas between the finger and catheter.

The most reliable and easiest method of diagnosis is microscopical examination, which usually reveals numerous ova in the mucous sediment of the urine and especially in the little clumps of blood cells.

R W B

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

SEPSIS AND THROMBOPHLEBITIS FOLLOWING FORCEPS DELIVERY

Mrs. A., a thirty-one-year-old para III, entered the hospital on February 5, 1938, because of scarlet fever at home; she was at term but not in labor.

The family history was negative. She had had the usual children's diseases and pneumonia. The tonsils and adenoids had been removed when she was a child, and the appendix in 1924. Catamenia began at twelve, were regular with a thirty-day cycle and lasted three or four days. The last period was April 12, 1937, making the expected date of confinement January 19. The first pregnancy was terminated at twelve weeks because of pernicious vomiting. The second pregnancy went to term and resulted in a living child weighing 10 pounds, 3 ounces; the convalescence was uneventful. The present pregnancy had been normal.

Before entering the hospital a Dick test was negative. The period of incubation had been passed, and a Dick test repeated after entry was again reported negative.

Two days later, February 7, she started in labor and was delivered by forceps of a child weighing 10 pounds, 15 ounces. There was more than the normal amount of bleeding after delivery but not enough for transfusion.

On February 9, forty-eight hours after delivery, the temperature rose to 104.0°F, and the pulse to 150. A consultation was held, and blood and uterine cultures were taken. The blood culture showed no growth after twenty-four hours. The uterine culture was positive for hemolytic streptococcus. Sulfanilamide was started immediately. She maintained a temperature of 103.0 to 104.0°F for approximately twenty-four hours, when it came down to 102.0, on February 13 it had dropped to 100.0. However on February 13 she had a chill and the temperature rose again to 102.0°F, but came down to 99.0 on February 14. The pulse rate dropped to 100. The temperature and pulse gradually rose again until February 17 when the temperature was 104.0°F, with a pulse rate of 140 to 150.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

used there for two days. On February 17 given a direct transfusion of 500 cc. of. On February 18 there was edema of the tenderness in groin and induration of the c wall, and the clinical picture was diag a pelvic thrombophlebitis. It was be at the fever might be due to the sul le, so the drug was discontinued. Fol mission of the drug, the temperature steadily until it reached 98.0°F on Feb- with a pulse of 80 to 90. The tempera ained normal for two days, then rose to with a corresponding rise in the pulse iter three days; it again reached normal remained until her discharge on March 18. lamide was administered in the follow ings: February 10, 70 gr., February 11, February 12, 70 gr., February 13, 90 gr., February 14, 60 gr., February 15, 40 gr., February 16, and February 17, 80 gr.

Laboratory work was as follows: Febru- white-cell count 16,000 and red-cell count , February 12, white-cell count 18,000 and count 2,800,000, February 14, white-cell 100 and red-cell count 2,980,000, February e transfusion, white-cell count 16,800 and count 3,200,000, and after transfusion, il count 11,000, red-cell count 4,160,000 oglobin 75 to 80 per cent, February 19, il count 10,500, February 21, white-cell ,200, February 23, white-cell count 20,000 cell count 3,970,000, February 28, white it 7700, red-cell count 4,270,000 and hemo 5 per cent, March 4, white-cell count l-cell count 4,270,000 and hemoglobin 75

ient. This is a case of puerperal infection n hemolytic streptococcus origin, which forty-eight hours after a forceps delivery r or not the scarlet fever at home had g to do with the disease is of course ques-

The temperature and pulse rose abrupt sultation was held and sulfanilamide thera ediate instituted. Following a gradual the temperature and pulse again rose, this incident with a definite pelvic thrombo- . The temperature reached normal in the hours and stayed normal for two days, gain, with a corresponding rise in pulse d finally reaching normal after a three-day ource, where it remained until discharge. reatment was conservative throughout. Sul ide was given for eight days and then dis ed. The thrombophlebitis was treated by leation of poultices to the lower abdomen : patient was kept in bed for two weeks

after a normal temperature had been reached and maintained. She was a very sick woman and while it cannot be definitely said that sulfanilamide affected the cure, it certainly is probable.

This case illustrates the proper handling of uterine infection. At the onset of the fever, cultures should be taken from the uterus and the blood. Sulfanilamide should be given whenever streptococci are proved to exist. This work can best be carried on with the assistance of a trained bacteriologist. In this case the uterus was left alone. The occurrence of thrombophlebitis proves that sulfanilamide does not necessarily prevent complications, and the use of heat rather than cold is the routine generally accepted at the present time.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions of the Medical Postgraduate Extension Courses have been arranged for the week beginning March 24

BERKSHIRE

Thursday March 28 at 4.30 p.m., at the Bishop House of Mercy Hospital, Pittsfield. Head and Spine Injuries. Instructor Walter R. Wegner. Harry G. Mellen, *Chairman*.

BRISTOL SOUTH (Fall River Section)

Tuesday March 26, at 4.30 p.m., at the Union Hospital, Fall River. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor Edward F. Bland. Howard P. Sawyer *Chairman*.

FRANKLIN

Thursday March 28, at 8.15 p.m., at the Franklin County Hospital, Greenfield. Syphilis in Pregnancy and the Offspring. Instructor Francis M. Thurmon. Halbert G. Stetson *Chairman*.

HAMPDEN

Thursday March 28 at 4.00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8.15 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Common Problems in Neurology. Indications for lumbar puncture. Instructor H. Houston Merritt. George L. Schadt, *Chairman*.

HAMPSHIRE

Thursday March 28 at 4.15 p.m., in the Nurses Home of the Cooley Dickinson Hospital, Northampton. Gonorrhea in the Female. Instructor Alonzo K. Paine. Warren P. Cordes, *Chairman*.

MIDDLESEX SOUTH

Thursday March 26 at 4.30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Syphilis in Pregnancy and the Offspring. Instructor C. Guy Lane. Dudley Merrill *Chairman*.

NORFOLK

Thursday March 28 at 8.30 p.m., at the Norwood

Hospital, Norwood. Pneumonia Instructor
Maxwell Finland. Hugo B C Riemer, *Chairman*

NORFOLK SOUTH

Monday, March 25, at 8 30 p m, at the Quincy City Hospital, Quincy Common Problems of Neurology Indications for lumbar puncture. Instructor T J C von Storch David L Belding, *Chairman*

PLYMOUTH

Tuesday, March 26, at 4 00 p m, in the Nurses' Home of the Brockton Hospital, Brockton Pneumonia. Instructor Earle M Chapman Walter H. Pulsifer, *Chairman*

SUFFOLK

Thursday, March 28, at 4 30 p.m, in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. The Use of Drugs in the Treatment of Childhood Infections Instructor John A. V Davies. Reginald Fitz, *Chairman*

DEATH

ADAMS—ZABDIEL B ADAMS, M.D., of Brookline, died March 16 He was in his sixty sixth year

Dr Adams attended the Massachusetts Institute of Technology and received his degree from the Harvard Medical School in 1903 From 1903 to 1905 he was house surgeon at the Boston City Hospital From 1905 to 1906 he was assistant surgeon at the Children's Hospital and from 1906 to 1924 orthopedic surgeon at the Massachusetts General Hospital, serving as chief of the orthopedic service the last two years From 1925 until his death he served as consulting orthopedic surgeon at the Lakeville State Sanatorium in Middleboro

For six years Dr Adams was instructor in orthopedic surgery at Harvard Medical School and associate in anatomy there from 1919 until his death

Among his affiliations were fellowships in the Massachusetts Medical Society and the American Medical Association, and memberships in the American Orthopaedic Association, of which he was president in 1929, and the American Academy of Orthopaedic Surgeons

His widow, a sister, a daughter, a son and two grandchildren survive him.

NEW HAMPSHIRE MEDICAL SOCIETY

WOMAN'S AUXILIARY, AMERICAN MEDICAL ASSOCIATION

The eighteenth annual convention of the Woman's Auxiliary to the American Medical Association will be held in New York City, June 10-14, with headquarters in the Hotel Pennsylvania In view of the fact that the second edition of the World's Fair will accelerate advance hotel reservations, it is urged that reservations be made immediately through the Housing Bureau, which has been set up by the American Medical Association. Inquiries should be addressed to Dr Peter Irving, Room 1036, 233 Broadway, New York City

DEATH

BIELSCHOWSKY—ALFRED BIELSCHOWSKY, M.D., director of the Dartmouth Eye Institute, died in Brooklyn, New York, on January 5, at the age of sixty-eight.

Professor of ophthalmology and chief of the Eye Clinic at the University of Breslau, Germany, Dr Bielschowsky came to the Dartmouth Eye Institute as visiting ophthalmologist in 1934, and was appointed visiting lecturer in physiologic optics in 1935 Dr Bielschowsky had served as director of the Eye Institute since 1937 In addition to his work at Dartmouth, he had been an associate in ophthalmology at the Harvard Medical School since 1938

Dr Bielschowsky is survived by his widow, Frieda (Blume) Bielschowsky, and a daughter

MISCELLANY

VALUE AND LIMITATIONS OF THE TUBERCULIN TEST

The value of the tuberculin test as a means of finding cases of tuberculosis by mass testing has lately been questioned. At the last annual meeting of the National Tuberculosis Association a symposium on the tuberculin test and x ray was presented. One of the speakers (Long, E R. The Tuberculin Test Its value and its limitations. *Am Rev Tuberc* 40 607-620, 1939) summarized the values and limitations of the tuberculin test in a paper, from which the following abstract is derived

The queries and doubts that have arisen concerning the tuberculin test within the last two years have had a healthful effect on our anti tuberculosis campaign in forcing us to review our current procedures and test the validity of past beliefs This paper omits all discussion of the tuberculin test except as a means for finding cases of tuberculosis

In guinea pigs the test is practically infallible The success of the campaign for eradication of bovine tuberculosis, based, as it is, on the tuberculin test, is a strong empiric argument for the practical value of the test. The almost constant finding of tuberculous lesions in cattle slaughtered because of a positive tuberculin reaction, and the failure to find tuberculosis in the routine inspection of millions of cattle not reacting and killed for meat production, is tangible evidence for its specificity and adequacy In certain other animals, however, tuberculin allergy is far less conspicuous

Tuberculin sensitivity in man can never be studied with the same thoroughness as in guinea pigs or cattle. However, observations on children vaccinated with BCG have enabled us to study the results of artificial infection and its relation to tuberculin sensitivity and these studies indicate that after very mild infection an overwhelming majority of children become tuberculin positive.

We are here not concerned with the total number of tuberculin reactors that may be detected, but rather with the detection of significant tuberculosis by the use of the tuberculin reaction as a preliminary screen. ("Significant tuberculosis" or "a case of tuberculosis" in its public health sense, is restricted to infection with the tubercle bacillus which has proceeded to the point where it has produced symptoms recognized as those of clinical tuberculosis, or has brought about changes demonstrated by x-ray examination that are considered to indicate tuberculous disease) This definition places heavy responsibility on x-ray examination If the tuberculin test is used at all in case-finding, it is as a screen to obviate the necessity of the more expensive x-ray examination. (In young adult groups, one third or more of those tested with tuberculin may not react, and these need not be x-rayed.) It is believed by some that, on the basis of cost alone, saving x-ray examination of one third of the subjects would not counterbalance the cost of the tuberculin test.

What does the standard first and second dose method of tuberculin testing (fully defined by the author) detect and overlook? Of 610 cases of pulmonary tuberculosis diagnosed in the Henry Phipps Institute during five consecutive years, all but 1 reacted to tuberculin. Among the 609 reactors 94 per cent of the white and 96 per cent of the colored reacted to the first (minimal) dose (OT used in earlier PPD in later years). However, in other similar clinics and in hospitals attention is drawn occasionally to cases of unquestioned tuberculosis, even with positive sputum, in which the reaction is negative. Explanations for these exceptions are easily found: the fact remains that cases of anergy in typical hospital patients are probably few.

However clinic experience is not representative of the conditions of case finding as they occur in mass surveys. Some surveys deal with groups of high and others with low infection incidence. Evidence shows that the tuberculin test is an efficient preliminary case-finding measure in groups under relatively heavy exposure, as nurses in a hospital or sanatorium. For example among 400 nurses, 22 cases* of tuberculosis have occurred, all of which developed or already exhibited tuberculin sensitivity some months in advance of the onset of a recognized lesion, and no case has developed in the absence of tuberculin sensitivity. In groups under exceptional exposure the tuberculin test is an effective warning sign indicating the need of close and frequent observation.

Studies conducted by the United States Public Health Service and the Department of Health of Tennessee have shown that the tuberculin test is far from being the sharp indicator, once popularly supposed, of previous simple tuberculous infection. These studies disclosed a large amount of what appears to be healed primary tuberculosis in people not reacting to tuberculin. A supplementary survey conducted at Hagerstown, Maryland, however indicated that for case-finding purposes the tuberculin test is highly effective. In the 1000 subjects examined by both tuberculin test and x-ray, 13 cases of tuberculosis were discovered, all but 1 of which reacted to tuberculin; this case showed scarred apical disease of slight extent and had been apparently long arrested. The author believes that an accuracy of about 90 to 95 per cent may be expected of the tuberculin test as a means of selecting subjects for examination by x-ray but admits that a loss of 5 to 10 per cent is serious, but perhaps inevitable.

The attempt to divide all mankind into two groups infected and not infected, is futile and probably responsible for most of the present confusion. Two other groups must be recognized: those infected, not yet positive, but to be positive shortly thereafter and those infected and previously positive, but now negative. (A possible fifth group would include those who are infected and never develop a positive reaction.)

Allergy does not develop simultaneously with infection. There may be an interval of from two to three weeks between infection and a positive tuberculin reaction. In any large survey there may be a few cases recently infected and not tuberculin-positive. In some of these, x-ray lesions may develop.

The second group (previously positive, now negative) is more important and probably the greatest single cause for our present confusion. We have tended to overlook the fact that with the arrest and healing of tuberculous lesions allergy wanes and finally may disappear.

In a period, however when the mortality rate is dropping steadily and the morbidity rate is following in some proportionate relation, and when in addition an improved

control of tuberculosis is bringing about a steadily increasing isolation of patients with open lesions, it is only to be expected that reinfection the rule in the past, will become progressively less frequent. The infections that formerly constantly restored a waning allergy will be far less frequent in the future and we may look forward to the time when loss of allergy will be as common as its maintenance.

A study of 2490 positive reactors, all examined at the Henry Phipps Institute, showed that 276 or approximately 11 per cent, became negative, either transiently or for the balance of the period of observation. It was disclosed also that the stronger the original reaction the less frequently it reverted to negative and vice versa. Further the correlation with exposure was equally striking. In 58 per cent of the families in which no tuberculosis was present, the tuberculin reaction became negative in some member of the family while in families where there was continuously a member with sputum-positive tuberculosis, allergy disappeared in some member of the household in only 8 per cent of the families.

The fact that allergy tends to disappear where there is no exposure, and has more and more tendency to remain as exposure is presumably more frequent, suggests strongly that reinfection is responsible for the maintenance of the positive reaction. The epidemiological significance of this fact is obvious.

In the 276 cases in which the reaction became negative, no abnormality was detected in the film in 94 per cent and there were no cases of active reinfection type tuberculosis in the entire group. In 10 cases with what were read as calcified lesions, the reaction became negative.

Two cases are recorded in which tuberculin-negative children with calcified lesions became tuberculin-positive coincidentally with the development of fresh active tuberculosis.—Reprinted from *Tuberculosis Abstracts* March, 1940

NOTE

The seventh E. Starr Judd Lecture at the University of Minnesota was given on March 14 by Dr. Edward D. Churchill, John Homans Professor of Surgery, Harvard Medical School, and chief of the West Surgical Service, Massachusetts General Hospital. The subject was "Surgery of the Lungs."

CORRESPONDENCE

OBSTETRICS OF FORMER DAYS

To the Editor Just after the turn of the century a large number of immigrants of the laboring class came to this town. There was no birth control no race suicide. Among certain groups was a belief brought from the home country that if a woman did hard physical labor during her pregnancy and particularly during the first stage of labor the second stage would be easier and shorter. And perhaps they were right.

May I cite a case in point. Labor began while the woman was digging potatoes in a nearby field. When she could remain on her feet no longer she was carried to the house and placed in bed, just as she had been picked up. As usual, no physician had been engaged, but one was hastily summoned. He arrived barely in time to witness the birth. "Recovery was uneventful."

Similar incidents with minor variations could be cited

by the score, and all without casualties to mother or child.

What did it mean? It had led to natural selection of child-bearing women for generations in the home country—Mother Nature can do a pretty good job if she does not have too much assistance or interference.

Furthermore, it resulted in large families to those best able to produce them. I regret to add that the mothers of the next generations have not been so spontaneous or so productive, with seemingly far less resistance.

Those early immigrants called physicians only because they had been told that it was "the law" in this country. Only neighbors' wives attended the births "at home," but if a woman survived her first childbirth there was seldom any trouble in succeeding births. The death rate among primiparae was not known, as they were recorded only by the parish priest who attended the funeral. The living births were recorded at christenings, but the stillbirths were not reported at all, and the causes of death only when the priest made the diagnosis and recorded it if he saw fit.

As there are but a few of us left who were active among those people in that period I have felt that the history of that ten or fifteen years should be recorded.

Being a young man, recently out of college, I was able to learn and speak the necessary part of their language and so was much in demand. Incidentally, I was delighted to get ten dollars and satisfied with five dollars and often received only the twenty five cents for the birth return—perhaps it was all the service was worth in comparison with the time and care of the modern obstetric case.

FRANK T. WOODBURY, M.D.

21 Chestnut Street,
Wakefield, Massachusetts

NOTICES

REMOVAL

HAROLD N. MCKINNEY, M.D., announces the removal of his office to 149 Warren Street, Roxbury.

BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Friday, March 29, in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon. Dr. Leonard J. Carmichael will give the second in a series of talks by different speakers on the past, present and future of the New England Medical Center and its component parts. Dr. Carmichael's subject will be "Tufts and the New England Medical Center."

All interested in the subject are cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, March 27, from 2 to 4 p.m. Drs. H. F. Newton and S. A. Levine will speak on "Dyspnea."

Physicians and students are cordially invited to attend.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held on Thursday evening, April 4, at 7:15 in the classroom of the nurses' residence. Dr. Laurence B. Ellis, the guest speaker, will talk on "Circulatory Failure." A question period will be led by Dr. Elsie W. Brown.

MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the White Building Amphitheater of the Massachusetts General Hospital, on Tuesday, March 26, at 5:00 p.m.

PROGRAM

A New Method for Studying Bone Growth. Dr. T. H. Ingalls

The Treatment of Trigeminal Neuralgia with Vitamin B₁ (Thiamin). Drs. A. S. Rose and B. M. Jacobson.

Studies with Radioactive Arsenic

Demonstration of Radioactive-Tracer Counting Apparatus. Dr. A. F. Kip

Distribution of Arsenic between Blood and Viscera. Dr. F. T. Hunter

SUFFOLK DISTRICT MEDICAL SOCIETY

A meeting of the Suffolk District Medical Society will be held at the Boston Medical Library, 8 Fenway, on Wednesday, March 27, at 8:15 p.m.

PROGRAM

Scientific meeting

Acute Infectious Diarrhea. Dr. Roy F. Feemster

The Maintenance of Adequate Nutrition in Chronic Diarrhea. Dr. Maurice B. Strauss

Discussion by Drs. Chester M. Jones and Charles F. McKhann

NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Norfolk District Medical Society will be held in the Hotel Somerset, Boston, on Tuesday evening, March 26, at 8:30. Tel. KEN 2700.

PROGRAM

Business

Diseases of the Colon from the Medical and Surgical Standpoints. Dr. Edward L. Young

Discussion to be opened by Drs. Charles W. McClure and John W. Spellman.

Collation.

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Mallory Institute of Pathology, Boston City Hospital, on Monday, March 25, at 8:15 p.m.

PROGRAM

Cor Triloculare in a Thirteen-Year Old Boy with Pulmonic Stenosis. Dr. O. J. Wollenman, Jr.

An Unusual Case of Dissecting Aneurysm. Dr. George Bartol

Anticoagulants and Sulfapyridine in the Treatment of Subacute Bacterial Endocarditis. Dr. C. N. Duncan.

Changes in the Cutaneous Circulation of Male Castrates and Eunuchoids. Dr. E. A. Edwards.

A Case of Temporal Arteritis. Dr. H. J. Jeghers.

Paroxysmal Precordial Pain in Mitral Stenosis. Dr. A. M. Burgess, Jr.

The Significance of Marked Left Deviation in the Electrocardiogram. Dr. J. M. Faulkner

Interested physicians and medical students are invited.

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, will be held at "The Hut," on Friday afternoon.

arch 29 at 4-00. Dr Chester S. Keefer will speak, his topic being "Some Clinical Aspects of Acute and Chronic Bright's Disease."

MASSACHUSETTS TUBERCULOSIS LEAGUE

The annual meeting of the Massachusetts Tuberculosis League will be held on Thursday, March 28 at the Middlesex County Sanatorium, Trapelo Road, Waltham, Massachusetts.

PROGRAM

- 4.30 p.m. Personally conducted tours through Middlesex County Sanatorium.
- 5.15 p.m. Business session. Election of officers and directors.
- 6.30 p.m. Dinner
- 7.30 p.m. Prevention and Control of Tuberculosis in Massachusetts. Dr Frederick T. Lord.
- 7.50 p.m. The County Sanatorium and Its Work in Middlesex County. Drs. Sumner H. Remick and Henry D. Chadwick.

The dinner will be \$1.00 per person. Reservations should be sent to Massachusetts Tuberculosis League, 148 Little Building, Boston. Tel. HAN 5480.

WALTHAM MEDICAL MEETING

The regular monthly clinicopathological conference of the Metropolitan State Hospital will be held at the hospital on Wednesday evening, March 27 at 8-00. A case presenting features of neurological and medical interest will be presented by Drs. Richard C. Wadsworth and Emory Friedman. It will be discussed by Dr. Siegfried J. Thannhauser.

All interested physicians are cordially invited.

MASSACHUSETTS DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

- School Physician (Male or Female) \$5 a Day Boston
- School Physician (Female) \$250 a Year Northampton
- School Physician (Male) \$1000 a Year Northampton

Director of State Civil Service, Ulysses J. Lupien has announced that competitive examinations are to be held on April 20 in order to find eligibles for appointment to the above positions.

The entrance requirement is as follows: applicants must be registered physicians under the State Board of Registration in Medicine. The last date for filing applications is Saturday April 6, at 12 o'clock noon.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|----------|-----------------------|
| Salem | April 1 | Harold C. Bean |
| Haverhill | April 3 | William T. Green |
| Lowell | April 5 | Albert H. Brewster |
| Gardner | April 9 | Mark H. Rogers |
| Brockton | April 11 | George W. Van Gorder |
| Pittsfield | April 15 | Francis A. Slowick |
| Northampton | April 17 | Garry deN. Hough, Jr. |
| Fall River | April 22 | Eugene A. McCarthy |
| Framingham | April 23 | Paul L. Norton |
| Worcester | April 26 | John W. O'Meara |

INTERNATIONAL COLLEGE OF SURGEONS

The New England Activities Committee of the International College of Surgeons announces a program to be held at the Hospital of St. Raphael, New Haven, Connecticut, on Wednesday March 27

PROGRAM

- 9 a.m. to 12 m. A series of operations will be performed.
- 12 30 p.m. Luncheon.
- 2 p.m. to 4.30 p.m.
- Opening Address. Dr G. S. Foster
- Address of Welcome. Dr Joseph Lande.
- Appendicitis. Dr James A. Gettings.
- Spondylolisthesis. Dr Dennis O'Connor
- Partial Intestinal Obstructions. Dr Andrew McQueney
- Talk on Gastric Surgery. Dr Edward Kirschbaum.
- Gall Bladder Surgery. Dr A. J. Mendillo.
- On Head Injuries. Dr William German.
- Pathology. Dr Robert Nesbit.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY MARCH 24

MONDAY MARCH 25

- *8.15 p.m. New England Heart Association. Malvern Institute of Pathology Boston City Hospital.

TUESDAY MARCH 26

- *9-10 a.m. Diaphragmatic Hernias. Dr Joseph H. Marks. Joseph H. Pratt Diagnostic Hospital.
- 5 p.m. Hospital Research Council. Massachusetts General Hospital, White Building amphitheater.

WEDNESDAY MARCH 27

- 9-10 a.m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.
- 2-4 p.m. Dyspepsia. Drs. H. F. Newton and S. A. Levine. Peter Bent Brigham Hospital.
- 6.30 p.m. Tufts College Medical School Alumni Association. Hotel Somerset, Boston.

THURSDAY MARCH 28

- *9-10 a.m. The medical, social and preventive aspects of selected cases. Preceptors and medical students. Joseph H. Pratt Diagnostic Hospital.

FRIDAY MARCH 29

- *9-10 a.m. Some Observations on Pituitary Adenomas. Dr M. G. Soutman. Joseph H. Pratt Diagnostic Hospital.
- 12 m. Luncheon meeting of the clinical staff of the Boston Dispensary. Joseph H. Pratt Diagnostic Hospital.
- 8 p.m. New England Pathological Society. Peter Bent Brigham Hospital.

SATURDAY MARCH 30

- *9-10 a.m. Hospital case presentation. Dr Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

- MARCH 25—Monthly clinical meeting and luncheon. Carney Hospital. Page 469 issue of March 14.
- MARCH 27—Clinicopathological conference of the Metropolitan State Hospital, Waltham. Notice above.
- MARCH 27—International College of Surgeons. Notice above.
- MARCH 28—Massachusetts Tuberculosis League. Notice above.
- MARCH 28—Staff meetings. United States Marine Hospital. Page 514.
- APRIL 4—Monthly clinical conference and meeting of the staff. New England Hospital for Women and Children. Page 514.
- APRIL 11—Pennsylvanian Association of Physicians. 8.30 p.m., Hotel Barlett, Philadelphia.
- APRIL 15-17—American Association for the Study of Gout. Page 203 issue of February 1.
- APRIL 15-19—New England Health Institute. Page 284, issue of February 15.
- APRIL 24—Massachusetts Dental Society. Page 365 issue of February 29.
- APRIL 24-25—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.
- MAY 10-18—American Scientific Congress. Page 1043 issue of December 28.

MAY 13 — United States Pharmacopoeial Convention Page 202 issue of February 1
 JUNE 7-8 — American Heart Association Page 469 issue of March 14
 JUNE 7-9 — American Board of Obstetrics and Gynecology Page 1019, issue of June 15
 JUNE 8 and 10 — American Board of Ophthalmology Page 719, issue of November 2
 JUNE 10-14 — American Physicians Art Association Page 332 issue of February 22
 JUNE 23-25 — Maine Medical Association Annual meeting Rangeley Lakes
 OCTOBER 21 — American Board of Internal Medicine Inc Page 369, issue of February 29

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

APRIL 3 — Page 422 issue of March 7
 MAY 8 — Annual meeting Salem Country Club Peabody

FRANKLIN

MAY 14 — Franklin County Hospital Greenfield

HAMPSHIRE

MAY 8 at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MAY 15 at 12 15 p.m. at the Unicorn Country Club Stonham

MIDDLESEX NORTH

APRIL 24
 JULY 31
 OCTOBER 30

NORFOLK

MARCH 26 — Page 514

NORFOLK SOUTH

APRIL 4
 MAY 2

PLYMOUTH

APRIL 18 — State Farm
 MAY 16 — Lakeville State Sanatorium Middleboro

SUFFOLK

MARCH 27 — Page 514
 APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers. Program and speakers to be announced later
 MAY 2 — Censors meeting Page 244 issue of February 8

WORCESTER

APRIL 10 — Worcester Hahnemann Hospital
 MAY 8 — Worcester Country Club
 Meetings begin with a dinner at 6 30 p.m. and are followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

Trapping the Common Cold George S Foster 125 pp
 New York Fleming H. Revell Co, 1940 \$1.25

Diathermie chirurgicale C-A. Arraud. 216 pp Paris
 Gauthier-Villars, 1939 50 Fr fr

Studies in the Development of Young Children Nancy Bayley 45 pp Berkeley, California University of California Press, 1940 35c.

The Electrocardiogram in Congenital Cardiac Disease A study of 109 cases, 106 with autopsy Maurice A Schmitz 147 pp Cambridge, Massachusetts Harvard University Press, 1940 \$3.00

Transactions of the American Association of Genito-Urinary Surgeons Fifty-first annual meeting held at Williamsburg, Virginia, May 24, 25 and 26, 1939 Vol 32 391 pp Saint Paul and Minneapolis Bruce Publishing Co, 1939

A Textbook of Surgery John Homans Fifth edition 1272 pp Springfield, Illinois, and Baltimore Charles C Thomas, 1940 \$8.00

The Management of Obstetric Difficulties Paul Titus

Second edition 968 pp St Louis C V Mosby Co 1940 \$10.00

Modern Diabetic Care Including instructions in the diet and the use of the old and new insulins Herbert Pollack 216 pp New York Harcourt Brace and Co, 1940 \$2.00

The Medical Career And other papers Harvey Cushing 302 pp Boston Little, Brown & Co, 1940 \$2.50

Ten Years in the Congo W E. Davis 301 pp New York Reynal & Hitchcock, 1940 \$2.50

BOOK REVIEWS

Transactions of the American Association of Genito-Urinary Surgeons Fifty-first annual meeting held at Absecon, New Jersey, May 2, 3 and 4, 1938 Vol. 31 405 pp St. Paul and Minneapolis The Bruce Publishing Co, 1938

This volume contains the proceedings of the annual meeting of the American Association of Genito-Urinary Surgeons and consists of twenty-nine papers by leading American urologists, together with the discussions of the papers. That the specialty of urology is constantly increasing its scope and connections with other branches of medicine is obvious from the variety of subjects dealt with, such as arterial hypertension occurring in unilateral kidney disease, transplantation of endocrine tissue, endometriosis of the bladder, adrenocortical syndromes and adrenal tumors, and the cure of lung metastasis from kidney carcinoma by lobectomy. Other papers deal with general principles of treatment, such as the treatment of cancer with the newer types of roentgen ray therapy, in addition there are the usual case reports of rare conditions, with reviews of the literature. All in all, this volume contains some excellent and important papers and evidences the progressiveness of American urology.

Pathogenic Microorganisms A practical manual for students, physicians and health officers William H. Park and Anna W. Williams. Eleventh edition. 1056 pp Philadelphia Lea & Febiger, 1939 \$8.00.

"Park and Williams" is now a classic text and from the beginning, when it was first published in 1899, has taken its place among the foremost treatises on bacteriology in any language. Well organized and thorough, it has always maintained that wise balance between theory and practical experience which characterized the mentality of its senior author. Dr. Park was one of the great American bacteriologists, his studies covered a wide range and he soundly and sagaciously correlated his specialty with medical practice and public health. He utilized, in the writing of this book, moreover, the accumulated experience of a distinguished group of collaborators at the New York City laboratories, among whom were Anna Williams, Charles Krumwiede and, in the present edition, Ralph Muckenfuss and other active and competent men and women. The book represents a complete and comprehensive treatise, it is a textbook and a reference book, a type which the reviewer favors over elementary and abbreviated texts, even for undergraduate medical students. It is one of the few books that include an excellent practical section on clinical protozoology and an adequate treatment of the yeasts and molds.

This edition is in every sense worthy of its predecessors and continues the fine tradition of Dr. Park whose recent death was an irreparable loss to science.

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NUMBER 13

THE WARRENS OF NEW ENGLAND AND THEIR FRIENDS

HUGH STALKER, M.D.*

GROSSE POINTE, MICHIGAN

FORTY years ago Sir William Osler¹ said to the students of McGill "While medicine is to be your vocation, or calling, see to it that you have also an avocation — some intellectual pastime, which may serve to keep you in touch with the world of art, of science or of letters. Begin at once the cultivation of some interest other than

it is living it."² It is not examining faded writings on limp old paper, it is being with the writer as the letter is penned. We can slip back across the centuries and leave behind us this present materialistic world. Read in the spirit that it should be read, it is a book of memories that sweeps time away. That is only one of the joys of possession

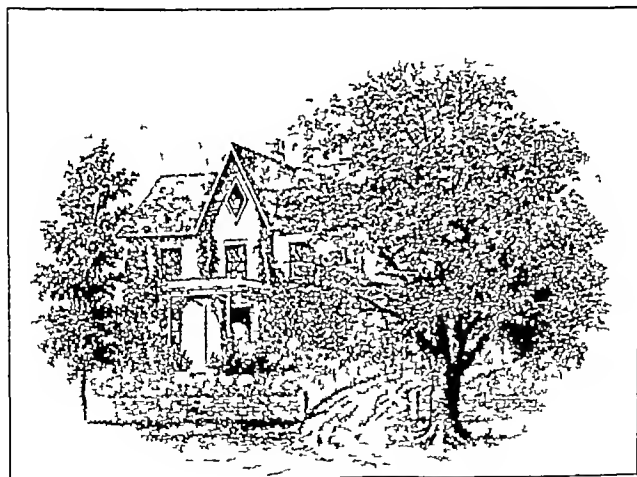


FIGURE 1 Warren House Roxbury

the purely professional. No matter what it is—but have an outside hobby.

Horace Walpole wrote "Nothing gives us so just an idea of an age as genuine letters: history waits for its last seal from them." To even the least imaginative there is a never-ending source of interest and curiosity in the contemplation of letters and documents written by great personages of the past and present. It is not reading history

There are many men in medicine

who never sing

But die with all their music in them.²⁷

Their names will not go down the avenues of the world with renown, but their simple lives have created in their small spheres better and happier days for those with whom they have come in contact. Letters from many of these are in my collection.

As I turn the pages of my book of memories, the year 1792 summons many a figure from my as

*Lecturer in physical diagnosis and cardiology, Wayne University College of Medicine, physician to Out Patient Department, Harper Hospital and Children's Hospital of Detroit, Michigan.

sociative memory I turn to old New England of post-Revolution days, where lived John Warren, the first of that line of doctors destined to go down in the history of American medicine as pioneers. His ancestor, John Warren, a fellow passenger with Governor Winthrop, sailed from England in the *Arbella*, arriving in Salem, Massachusetts, June 12, 1630.³ His grandson Joseph built the family home in Roxbury (Fig 1) where the first Dr John Warren was born.

JOHN WARREN (1753-1815)⁴⁻⁹

In his early years, indifferent to studying, John did not learn to read until he was ten years old. At the grammar school in Roxbury he applied himself more assiduously, and acquired sufficient learning to enable him to enter Harvard College at the age of fourteen, where he was entirely dependent on his own resources for maintenance. Little is known of his life at Cambridge except that he became a good student of the classics and acquired a facility in speaking the Latin language, which was essential to him later in communicating with many foreigners, both lay and professional, with whom the political issues of the times brought him in contact. His diligence and a tenacious memory enabled him to stand well in his classes during the whole college course. Even at this early age, he showed an interest in the study of anatomy and, by his efforts, an association of students was formed for the purpose of cultivating that study. He took the degree of Bachelor of Arts in 1771 and immediately began the study of medicine with his brother Joseph, some twelve years his senior.

Joseph Warren was the first surgeon in America to use ligatures instead of scarring wounds with the actual cautery, and was the first in Massachusetts to devote himself wholly to obstetrics. On April 19, 1775, having ridden hastily out to Dedham to ascertain that he was not urgently needed for an approaching confinement, Joseph mounted his horse and hurried to Concord, where he arrived in time to direct the pursuit and harassment of the British forces as they retreated to Charlestown. On June 14, he was commissioned a major general, but three days later, before his commission was made out, he took part as a volunteer at the battle of Bunker Hill and died from a wound in the head.

When John Warren was only twenty years of age, he settled in Salem and associated himself with Dr Edward Augustus Holyoke. This was the year of 1773, when it is said the tea was thrown overboard in Boston Harbor, and tradition has it that Warren took active part in the

demonstration. About this time he joined a militia regiment in Salem commanded by Colonel Pickering and became its surgeon. Two years later, with the Revolution in progress, he first learned of his brother Joseph's death and hurried to Bunker Hill, where, while seeking for the body, he received a thrust from the bayonet of a sentinel, the scar of which he bore throughout his life.

Dr Holyoke became one of his warmest friends. Aided by this influential patron and winning his own way by his personality and evident ability, he developed a practice which was second only to that of his sponsor. One might infer that he hoped eventually to inherit Dr Holyoke's practice, but the irony of fate intervened, for the old gentleman lived to see a century turn the corner.

Since Dr Warren's anatomical researches and studies aroused the curiosity of his friends, he gave a few private demonstrations for their instruction. In 1780, he successfully gave a course of dissections to his colleagues in the Military Hospital, which was situated in a pasture at the corner of Milton and Spring streets, in the rear of the present Massachusetts General Hospital. Here he was senior surgeon until the close of the war. At that time there existed a strong popular prejudice against dissections, therefore, these exercises were conducted with the greatest secrecy. In the following year, they were more openly accepted and the students of Harvard University were permitted to attend. It was during this year and for the first time in America that Dr Warren performed the operation for disarticulation of the shoulder joint, with complete success. Early in his professional life he performed one of the first abdominal sections recorded in this country. This operation consisted in the opening and evacuation of a dermoid cyst in the left hypochondrium. The patient recovered.

Through bequests previously made to Harvard University, there existed foundations for a professorship of anatomy and surgery. No person had as yet appeared whose achievements and knowledge in these fields were sufficiently great to entitle him to fill these important chairs. Dr Warren was an excellent lecturer, and according to Oliver Wendell Holmes, who was later the professor of anatomy, "The driest bone of the human body became in his hands the subject of animated and agreeable description." President Willard perceived how much the interests of the university might be promoted by the talents of Dr Warren, and in 1783 the first medical institution in New England was established, with Dr Warren in the chair of anatomy and surgery, a position which he continued to occupy for thirty years. To fill this

chair was a herculean task, for, when unable to go from Roxbury to Cambridge by ferry, he had to drive a circuitous road of twenty miles. With the time thus entailed, in addition to his three hours of lecturing, and his practice, he was more than busy. Strangely enough he did not receive his M.D., an honorary one, until 1786. At that time the exercises of the medical school were held in Holden Chapel (Fig. 2) in the College Yard, and continued there for more than a quarter of a century.

Dr. Warren was one of a group who founded the Massachusetts Medical Society, incorporated in

He was the father of seventeen children, the eldest of whom was John Collins Warren and the youngest Dr. Edward Warren, his biographer. We note from this biography that he was a man of ardent temperament and agreeable social qualities, and that his frankness, candor and hospitality were conspicuous traits.

For some years before his death he was subject to attacks of angina pectoris, and in 1811 he suffered a slight paralysis of the right side, which never entirely disappeared. Four years later, when only sixty-two years of age, this patriotic and public spirited physician died of an acute illness,

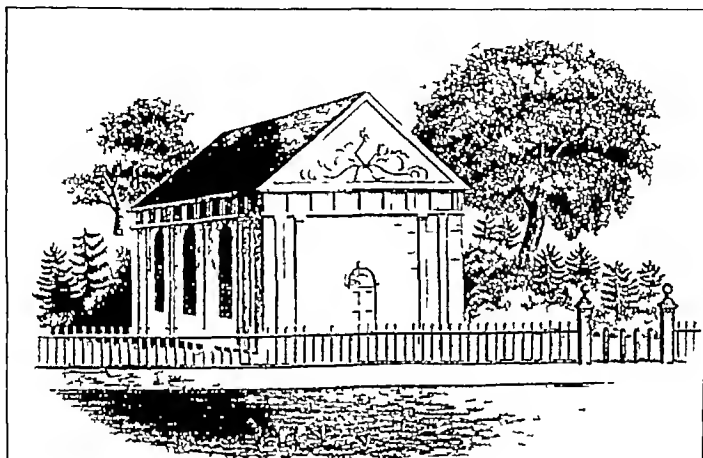


FIGURE 2 Holden Chapel Cambridge

1781, the first body in Massachusetts to establish a standard and issue a license to practice, a requisite which has come down to the present day. Two years later he delivered the first Fourth of July oration from the balcony of the State House in Boston, probably the oldest public building in America. The next year, with several other doctors, he established a smallpox hospital at Point Shirley and in 1792 inoculated more than fifteen hundred persons. He recognized six years later that yellow fever was non-contagious. In 1810, by his efforts and those of his colleagues, the medical branch of the university was moved to Boston. His most notable contribution to literature was a paper, appearing in 1813, entitled "A View of the Mercurial Practice in Febrile Diseases," in which he referred to the treatment of many of the prevailing diseases of that period, such as measles, "throat distemper," consumption, dysentery, spotted fever and spinal meningitis.

having, faithfully continued to visit his patients up to within a few days of the end. He was remembered as a presence to be felt and known."

JOHN COLLINS WARREN (1778-1856)⁴ 6 8, 10-12

It would be well today if all members of the medical profession and also those engaged in business would read the beautiful and noble "Dedication of *Letters to a Young Physician*" addressed to John Collins Warren by his friend James Jackson, than which there is "nothing finer in the medical literature of our time."

On the death of John Warren his eldest son became Hersey Professor of Anatomy and Surgery at Harvard University. While it may be questioned whether his natural abilities as a teacher were as great as those of his father, he was undoubtedly a more highly educated man, having had the advantage of foreign study, and having been familiar with the teachings of the immediate

pupils of the celebrated John Hunter of Guy's Hospital, London. Shortly before leaving Paris after a sojourn of several months, he received an invitation, or order, from Napoleon to join the French army which was then organizing in Italy. His father, however, was anxious for his return and, obedient to his filial duty, Warren turned his back on his desires and came home.

As early as 1799, realizing the value of anatomical specimens as an aid to medical teaching, he brought with him from Europe a few models and preparations. These formed a nucleus, which he gradually increased during the first half of the

preceding the first in Great Britain by one year. Dr. Warren was one of the first surgeons in America to operate for strangulated hernia but met with great opposition, both from the friends of the patients and from the medical men. He was prominent also in the establishment of the American Medical Association, and in 1849 became its third president.

On October 16, 1846, occurs this entry in his journal: "I did an interesting operation this morning while the patient was under the influence of Doctor Morton's preparation to prevent pain. The substance employed was sulphuric ether." This

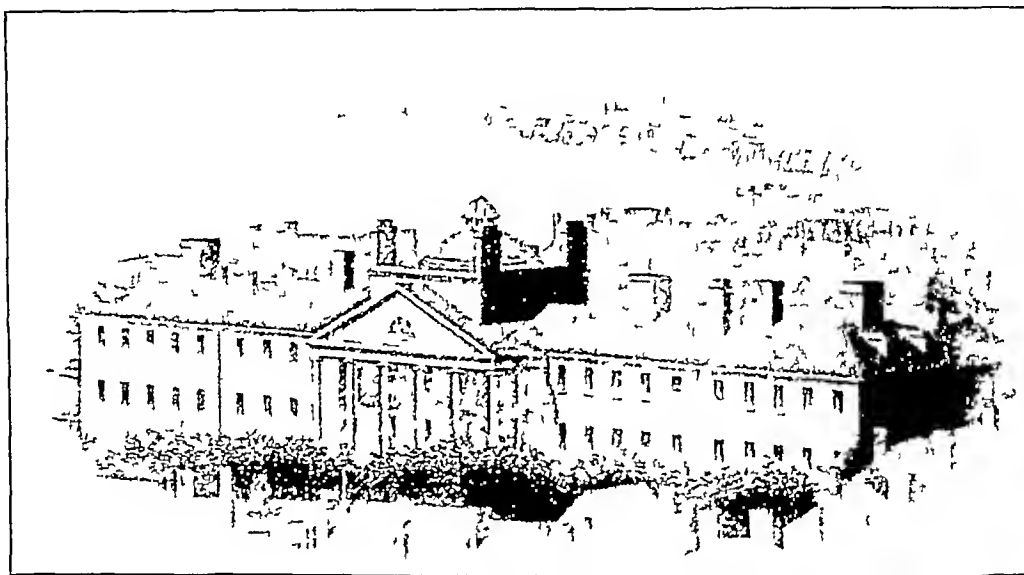


FIGURE 3 *Massachusetts General Hospital*

last century, until his collection became justly celebrated and was visited by physicians and students from far and near. Later this collection was given to the Harvard Medical School, where it was placed in the Warren Anatomical Museum. Body-snatching flourished at this time, but to what extent the corpses were procured by the connivance of officials, we do not know. Today an enlightened civilization recognizes the necessity of providing cadavers. Anticipating this by several years, Dr. Warren bequeathed his own body to the school, and his skeleton was prepared and placed in the museum, where it may be seen today.

In 1823 he purchased three acres of land, and with the aid of public subscription secured funds for the erection of Bunker Hill Monument, the cornerstone of which was laid by Lafayette and dedicated by the notable oration of Daniel Webster. Two years later, Dr. Warren was one of a committee appointed to draw up an act on dissection, and on February 28, 1831, the first anatomical law was passed in the United States,

laconic entry is the only reference made to the most important and dramatic event in the history of medicine in America. The operation was performed in the amphitheater of the Massachusetts General Hospital, then in the old Bulfinch Building (Fig. 3), the ether being administered by William T. G. Morton (1819-1868), an American dental surgeon.

After Dr. Warren had resigned from the Harvard Medical School and the Massachusetts General Hospital, he was able to spend more time in his paleontological work. Gradually this amazing life drew toward its close, and on May 4, 1856, at the age of seventy-eight, the end came after a brief and painless illness. Oliver Wendell Holmes said: "Whatever place he acquired or maintained no man can say that he did not earn it and keep it by his own fair labor."

JONATHAN MASON WARREN (1811-1867)^{4 6 8 13 14}

The third generation was represented by the second son of John Collins Warren, who was born in the house at 2 Park Street, Boston. In

1820 he entered the Boston Latin School, the old est school in the United States (founded in 1632), and remaining there through the full term graduated with his class in 1825. After studying two years with a private tutor, he was admitted to the sophomore class of Harvard College, but at the end of three months, because of ill health, he was obliged to leave. He went to Cuba to recuperate, and in the spring of 1828 returned to begin his medical studies under the tutelage of his father, Mason, as he was called, retained his associations with the Harvard class of 1830, receiving the degree of Master of Arts in 1844. Five years later he became a member of the Phi Beta Kappa Society. It was the custom of the time, dating from the period when the medical school was still at Cambridge, for the students to serve an apprenticeship, and the Warren home was the general gathering place. Near the front entrance a room with a sanded floor was provided for the purpose of study, and another was given over to the students for their meals. Gradually this practice yielded to the more modern system. In the fall of 1830 Dr. Warren entered his name as a student at the medical school on Mason Street from which he graduated in 1832 at the age of twenty-one.

In March of the same year, Dr. Warren sailed from Boston for Europe on the ship *Dover* which stopped en route at Charleston, South Carolina, and at the end of May he reached Liverpool where he found an epidemic of cholera raging. After visiting the clinics of Astley Cooper and Charles Bell in London, and Syme and Liston in Edinburgh, he arrived in Paris in the fall. In the band of American students who gathered there between the years of 1820 and 1840 were enrolled the majority of the most celebrated teachers and leaders of American medicine during the middle of the nineteenth century, notable among whom were Jackson, Bowditch, Holmes, Shattuck, and many more whose names on earth are dark. This group was known afterwards as the pupils of Louis. Following two winters of study in Paris, Dr. Warren visited Dublin in the spring of 1834, where Kennedy was master of the lying-in hospital and Macartney was presiding over his interesting museum at Trinity College. The winter of 1834-1835 was spent in Paris, where he watched Dieffenbach, on a visit from Vienna, perform his rhinoplastic operations. He also learned from Roux his method of operating for cleft palate, an ailment with which his own name was destined later to be intimately associated. In June, 1835, he returned home and prepared to begin his professional career.

When his father left for a visit to Europe in 1837, he entrusted a large practice to his son's care. Mason was eminently successful and became prominent, both as a medical and later as a surgical practitioner, for he was well qualified for these duties by a sound education, backed by good judgment and enhanced by a magnetic personality.

On April 30, 1839, he married Anna Caspar, daughter of Benjamin William Crowninshield, congressman and at one time Secretary of the Navy under Madison.

In 1843 he published his first article on staphylorrhaphy, an operation in which he was the pioneer in this country, the method which he devised being substantially that which is employed today. A full account of this operation is given in his book, *Surgical Observations and Cases* published in 1867, in which he refers to one hundred operations performed by him for fissure of the soft and hard palate. He also performed the first operation in America for the restoration of the human nose.

In February, 1846, Dr. Warren was elected one of the visiting surgeons of the Massachusetts General Hospital, and on October 16 of the same year assisted his father in the operation which was destined to be known as the first public demonstration of surgical anesthesia. A few weeks later he substituted in place of Morton's apparatus the cone-shaped sponge that was used to administer ether at the hospital for the next twenty years.

Though never robust, Mason Warren seems to have permanently suffered from the shock of a train accident which occurred on his return from a meeting of the American Medical Association in New York. This sent him to Europe twice in the following years. In 1864 he delivered the annual address before the Massachusetts Medical Society on "Recent Progress in Surgery," which summarizes well the status of surgery immediately preceding the antiseptic era.

He was senior surgeon of the Massachusetts General Hospital for the several years preceding his death from cancer of the gastrointestinal tract, he died in the very house in which he was born fifty-six years before. He was survived by his wife, four daughters and a son, John Collins Warren. Dr. Warren was a man of sensitive mind and distinguished bearing. He combined a cheerful disposition with an understanding which made him popular with patients and friends alike.

JOHN COLLINS WARREN II (1842-1927)* 18-19

The two discoveries—anesthesia and antiseptics—that have had the most profound influence on medical science came within the lifetime of John

Collins Warren, the son of Jonathan Mason Warren. The discovery of ether anesthesia was made when he was but a child, yet the controversies which followed it extended into the period of his early medical career, and he remained to the last a supporter of the claims of Dr W T G Morton as its real discoverer. In 1869 Dr Warren visited Lister in Glasgow, and made a study of his methods of employing antiseptics in surgical operations. On his return to Boston he assumed an active part in the introduction of these methods at the Massachusetts General Hospital.

The microscopic study of pathologic material derived from operations was at this time in its infancy. Dr Warren was one of the first in this country to develop the practical application of this study, not only for the benefit of the individual patient but also for the investigation of surgical disease. During the Civil War, while still a student, he served as a medical cadet in the Union forces, and there developed an interest in and a knowledge of surgical infections, which years later led to the writing of *Surgical Pathology and Therapeutics*, his most notable literary accomplishment.

Loyalty and devotion to the Massachusetts General Hospital and to its traditions were bred in the very fiber of Dr Warren's being. Through all the stages of promotion from house pupil to senior surgeon, he gave to the hospital the best he had. As a surgeon he was courageous, resourceful and thorough, he was admired and loved alike by his patients and his assistants. His Sunday ward visits when he was a senior surgeon were never to be forgotten. Each case on the wards was reviewed and discussed, all with a nice formality and kindly courtesy that was an inspiration to the group of assistants and younger colleagues who made it a point to attend these occasions. His deepest interest was in the surgery of tumors, and it was in this subject that he made his greatest contribution to the advancement of surgical knowledge and practice, notably in cancer of the breast. In 1896 he was chosen president of the American Surgical Association. He held the post of Moseley Professor of Surgery in the Harvard Medical School from 1899 to 1907, when he became emeritus.

A clear, systematic thinker, widely read in surgical literature and endowed with a happy faculty for apt illustration by anecdote or example, Dr Warren made an admirable teacher of surgery. His influence was felt by many generations of students in the medical school and the hospital. The time and attention he gave to the preparation of his lectures and clinics served as a standard to

his younger assistants, and the readiness with which he sacrificed his personal comfort or pleasure to this purpose was an inspiration to them, and a fair indication of the great respect in which he held his duties and privileges as an instructor of medical students.

On his retirement from active hospital service in 1905, Dr Warren gave up his private practice and devoted himself unremittingly to the promotion of the many interests with which his varied life had brought him in contact. Chief among these was the Harvard Medical School. When it became necessary to move the school from the inadequate buildings on Boylston Street, it was to him and to Dr Henry P Bowditch that there came the vision, the faith and the ability to conceive the magnificent project for the present buildings on Longwood Avenue, and to secure the great fund needed for their construction and endowment. We may rejoice that Dr Warren at least lived to see this vision materialize, as one after another of the hospitals and laboratories necessary to the completion of this great medical center came to occupy their places in accordance with the original plan. Even the dormitory for medical students, a gift from Harold Vanderbilt, which Dr Warren was the first to advocate, but which at that time seemed so remote as to be beyond all expectation, came into being and was actually opened before his death.

In 1899 a sum of money was left by the will of Caroline Brewer Croft for the investigation of the cure of cancer, and Dr Warren was named a trustee of the fund. This bequest led to the organization of the Cancer Commission of Harvard University, of which he was chairman for many years. Under his guidance, and chiefly because of his interest in this subject and of his happy faculty for securing and sustaining the interest of others, the commission added immeasurably to its resources and extended its activities. The early funds for the construction of the Collis P Huntington Memorial Hospital for Cancer Research were obtained almost entirely by Dr Warren's efforts. The dedication in 1922, by the President and Fellows of Harvard College, of the adjoining laboratory building, to be known as the J Collins Warren Laboratory, was held by him to be the supreme honor of the many accorded to him in his professional career.

Dr Warren had an almost boyish simplicity and directness, and a sense of humor which contributed in no small degree to the facility with which he established himself in the hearts of those about him. Neither his honors nor his accomplishments but rather his character and personality left that indelible impression on all with whom he came in

contact. His sincerity, his unfailing courtesy,—reminiscent of a generation earlier than his own—his indefatigable industry and his loyalty were the striking qualities which endeared him to his patients, his students and his colleagues.

Born of a family whose name for more than a century had meant not only eminence in the medical profession but also the highest ideals of service to the community, carrying on this trust successfully with its manifold duties and its obligations and laying down the burden only after having seen the accomplishment of his most cherished ambitions—this is the epitome of the life of John Collins Warren II. In his sixty-one years of professional life, he sought and found opportunity to maintain the enviable heritage of the traditions of his illustrious forbears and to add materially to their brilliant record.

JOHN WARREN (1874–1928)¹⁻¹

With the death of Dr. John Warren, the elder son of John Collins Warren II, there ceased to be, for the first time in one hundred and sixty-four years, a Warren to minister to the medical necessities of New England. Beginning with the entrance into practice of Dr. Joseph Warren in 1784, members of this stock, for all but twelve years in direct lineage, had practiced and taught medicine in Boston. John's brother, a year younger, was christened Joseph, so that, in this fifth generation, the two brothers held the same simple names as the brothers of Revolutionary fame.

From his mother John Warren inherited his fair complexion and his great size. As a boy he grew so rapidly that at school and even at college he was unable to enter into athletics with any degree of merit and skill. His height made him a conspicuous figure and induced a certain amount of shyness and reserve. Beneath these traits and his dignified manner was a truly gentle and lovable nature which few, perhaps, were given the opportunity to appreciate. He prepared for college at Noble's School and entered Harvard with the class of 1896. After graduating he attended the medical school, as it was almost inevitable that he with such ancestors, should follow the medical profession in one of its many branches. The practice of surgery held no attraction for him, so that after his graduation he became an assistant in the Department of Anatomy. He devoted himself enthusiastically to teachings, and to the improvement of its methods. When appointed associate professor in 1915, he began the formation of a teaching anatomical museum, available to the students at all times. This contains a series of frozen sections of the body and many illustrative dissec-

tions, each accompanied by a carefully labeled photograph. He raised a memorial fund for Thomas Dwight, a kinsman of the Warren family and former professor of anatomy, which consisted of a collection of anatomical specimens invaluable to the student.

From 1911 until his death he was the university marshal and was in charge at all Commencements, where he made a very imposing figure. During the war, he attended the first Plattsburg training camp and at once enrolled as a medical reserve officer. He was interested in collecting books having to do with the history of anatomy, and it seemed assured that he like Osler and many others, would experience the lasting joy and interest of the bibliophile. It was not to be, for he died at the age of fifty-four just one year after his father had passed on. His collection, together with the entire medical library of the Warren family, is now at the Harvard Medical School. His interests, other than his work, were few: his tastes simple—long country walks, or as some of us may remember, daily walks from his home to the school with coat-tails flapping and cane swinging. The latter, and his manner of clasping his belt with his thumb and rocking up and down on his toes while lecturing, his many idiosyncrasies of speech and his individual choice of words, will long be remembered by his students, and will keep him vividly before us as a true and scholarly gentleman, a masterly teacher.

HENRY INGERSOLL BOWDITCH (1808–1892)²⁻²²

Another name famed in the annals of medicine is that of Bowditch. Henry the third son of Nathaniel Bowditch, the celebrated mathematician and navigator, was born in Salem, Massachusetts, in 1808. His boyhood was passed in the house still standing on Essex Street next to the Old Witch House.

When he attended the Harvard Medical School his chief instructor was James Jackson, a noble, wise and conscientious physician and an excellent teacher who in those days stood at the head of his profession in Boston. Later Dr. Bowditch was under his guidance as an intern at the Massachusetts General Hospital. In the spring of 1832, through the kindness of a generous father, he was enabled to go abroad to pursue his medical studies. In Paris at La Pitié together with James Jackson, Jr., who died two years later, Oliver Wendell Holmes and Mason Warren he "walked the wards" with Louis. He met and was entertained by Magendie, the physiologist and later in England by Sir Astley Cooper, the surgeon. It was while in London that he met the young Olivia Yardley who later became his wife.

On his return, Dr Bowditch found a Boston seething under the tremendous denunciations of William Lloyd Garrison Bowditch became an abolitionist, and aided in the initial steps which led to the final passage of the law of the Massachusetts legislature forbidding the use of the

plans were discussed for the prevention of yellow fever, made possible by the \$5,000,000 grant from Congress Comparing the board's problems with present-day public ones, we note the similarity in human nature Dr Bowditch, in a letter to his son, tells of the many demands on the money

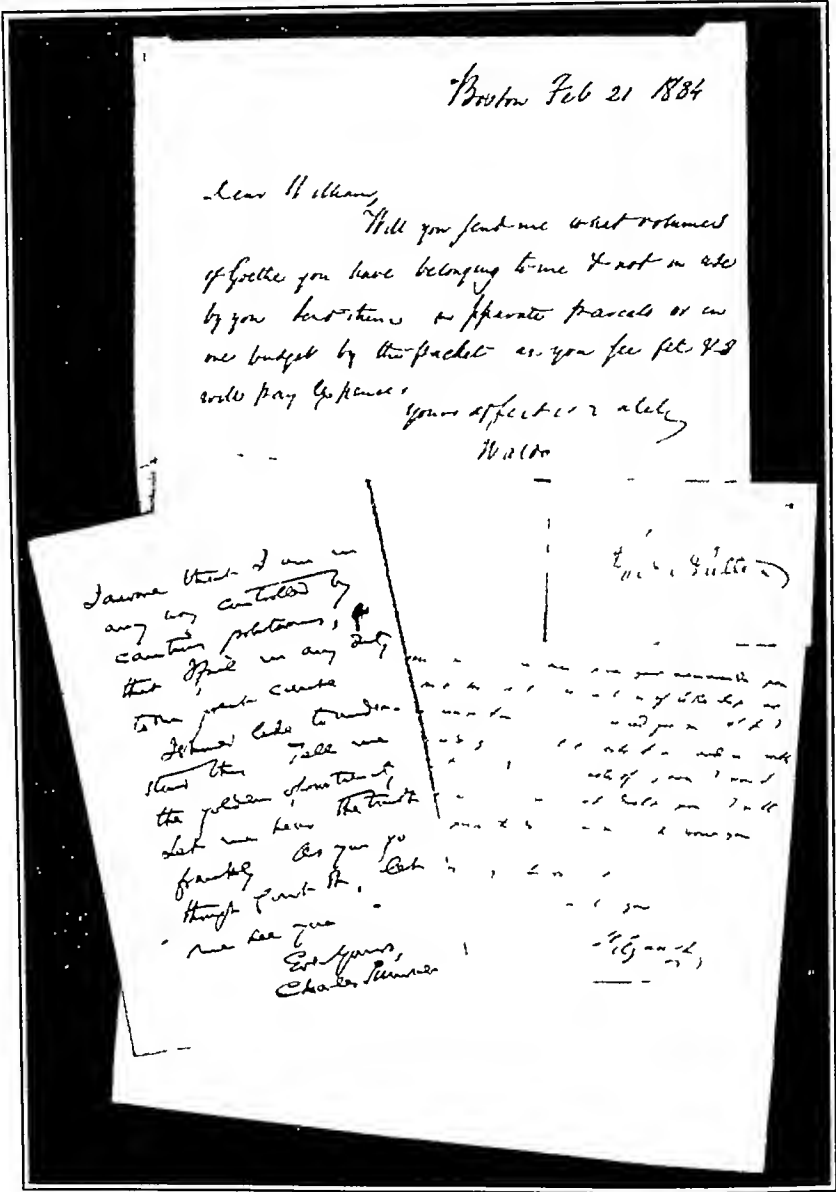


FIGURE 4 Letters of Friends of Henry Ingersoll Bowditch
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Harvard Medical School

state and town jails for the detention of runaway slaves Because of his activities along this line and others, he numbered among his friends James Russell Lowell, John Greenleaf Whittier, Ralph Waldo Emerson, Louis Agassiz and Charles Sumner (Fig 4)

In 1879 he spent a few days in Washington at the National Board of Health meetings, where

We would not let every two-penny township have its quota, as it is called, of the money put in our hands. Some of these men demanded that we should build them systems of sewers, etc, and because we would do no such thing, they have berated us The national board, by aiding the local board and spending freely the nation's money, has prevented the spread of the fatal disease in the Mississippi Valley, and we shall probably be able to return to Congress more than half the money allotted to us

Because of an ankylosed finger, the result of an infection, Dr Bowditch was forced out of the surgical field, so he resolved to specialize in diseases of the lungs and heart. Though opening the chest wall to remove accumulation of fluid had been done surgically from the time of Hippocrates, it was not until 1850 that Dr Bowditch introduced aspiration or paracentesis by means of a small tube and a suction pump.

Dr Bowditch lived a very active life, wrote many medical papers, carried on a large practice, was an ardent worker for the advancement of medicine, took part in medical meetings and was a voluminous correspondent until he died in 1892. He believed that a physician should be, so far as possible, a man of general culture and should not confine his knowledge to his profession alone lest he become a man of one idea and of narrow vision. His philosophical views to his son Vincent may well be taken to heart.

The chief advantage of your going abroad is to see the methods of medical men on the other side of the water to find wherein they excel or are inferior to us. While medicine is your chief aim, remember that I want you to see and hear all that you can of art and music. I often think I have done more good to some weary patients by sitting down and telling them of a delightful European experience than by all the drugs I have ever poured down their throats.

VINCENT YARDLEY BOWDITCH (1852-1929)²² 23 24

Dr Bowditch's son Vincent, a very good friend of mine, was born in Weston, Massachusetts. He graduated from the old Brimmer School in Boston and prepared for college at a private institution before entering Harvard, from which he graduated in 1875. He ranked high in his classes but found time to enjoy athletics. He was always popular with fellow students, and became chief marshal on Class Day. After three years at Harvard Medical School, and a year's service as a medical house officer at the Massachusetts General Hospital, he received his degree of Doctor of Medicine in 1879.

The ensuing two years were devoted to attending lectures and clinics in various European medical centers, but Dr Bowditch did not lose sight of his father's admonition, for he was a frequent visitor at the operas, theaters and art galleries.

In 1889, interested in the proper treatment of pulmonary tuberculosis, he went to Goerbersdorf, Silesia, and visited the sanatorium of Dr Herman Brehmer and afterward that of Dr Dettweiler (Brehmer's pupil) at Falkenstein, near Frankfurt, Germany. There was a difference of opinion as regards fresh air, rest and altitude in treating this disease. Here in America, at that time, it was be-

lieved that but one course was open—to send a patient "out West." Dr Bowditch believed that the same results might be accomplished nearer home and, filled with enthusiasm, he established in 1891 the Sharon Sanatorium at Sharon, Massachusetts, with accommodations for nine women. Later he was instrumental in establishing Rutland Sanatorium at Rutland, Massachusetts,—the first state tuberculosis sanatorium in the United States,—and he held the position of attending physician for eight years from the opening to October, 1898. In both these institutions, his work served chiefly to prove that there was much benefit in being treated by proper methods of living. The excellent results attendant on his method attest the great value of his work there.

Dr Vin, as his young friends called him, was always abreast of the times, establishing a preventorium for children at Sharon and an occupational department at Rutland for those capable of working. He was a great friend of Dr Edward Livingston Trudeau, who was a pioneer in tuberculosis, and who opened Saranac in the Adirondacks seven years before Dr Bowditch opened Sharon.

Dr Bowditch was president of the National Tuberculosis Association (1908-1919) and first president of the Massachusetts Tuberculosis League, founded in 1914. He died in Boston, at his home, December 20, 1929, of tuberculosis—the enemy to which he had given his life that he might overcome it in others.

His intelligence, his persistence in conquering obstacles, his high ideals, together with his delightfully uncomplicated and sympathetic nature, shared in contributing to the vigor and attractiveness of his personality. He was a frequent visitor at the Tavern Club, he was an ardent follower of the Boston Symphony Orchestra and, when his duties did not interfere, one could usually find him in his regular seat at the Friday afternoon concerts, he loved to sing and was well versed in the German lieder. The theater always intrigued him, and he kept abreast of the good current literature. In short he was a gentleman of the old school and a distinguished figure in the intellectual life of Boston.

HENRY PICKERING BOWDITCH (1840-1911)²⁴

This nephew of Henry Ingersoll Bowditch was born in Boston and graduated from Harvard College in 1861. He was a major of the Fifth Massachusetts Cavalry, a Negro regiment, during the Civil War. Following his service he resumed his studies and graduated in 1863 from the medical school. He then spent three years studying with Claude Bernard in Paris and Carl Ludwig in Leipzig, where he wrote his paper describing the all-

or-none law of the heart muscle. On his return to this country in 1871, he served as assistant professor of the newly created Department of Physiology at Harvard, establishing for the first time in the United States a physiological laboratory for students. Five years later he was made full professor.

At this time the method of instruction in the Harvard Medical School underwent a radical change, the most important feature of which was the adoption of the so-called "course." Up to that time the students of the school were not classified according to the time spent in study, but each one was expected to select from the instruction offered such subjects as seemed to him best adapted to his needs. Thereafter the students were divided into classes, and the subjects pertaining to an education in medicine were classified as first-, second-, third- and fourth-year studies, an examination at the end of the year testing the student's fitness to advance from one class to the next. Under this arrangement physiology was classified as a first-year study, however, in recognition of its importance as an experimental science, it was accorded a position as an independent department of the school and a fairly commodious laboratory was provided by raising the roof of the North Grove Street building.

In 1899 Prof Bowditch withdrew from the greater part of his work, and in 1906 he resigned from the George Higginson Professorship of Physiology. To him belongs the credit of first appreciating that the whole system of laboratory accommodations must be organized on a greater scale than had ever before been attempted, and in association with Dr John Collins Warren II he devised a scheme along the broad lines on which the plans of the new school have been worked out. He proposed a group of buildings arranged somewhat on the plan of the modern German medical school, the various departments being housed in separate institutes. He acted on a committee with Dr Warren, John D Rockefeller, Jr, and the president of the University, Charles W Eliot. Through the generosity of J P Morgan and John D Rockefeller, Jr, a fund was started, and in 1903 land was broken for the erection of the present buildings of the Harvard Medical School.

Prof Bowditch's last years were saddened by the gradual limitation of his vigor and activity through the advance of paralysis agitans. But throughout the gradual decline, he accepted his fate with cheerfulness and with gentle consideration of those about him. He died at his home in Boston on March 13, 1911, and was survived by his widow, the former Selma Knauth, whom he had met in

Leipzig, and a family of sons and daughters. One of the last times that he appeared in public was in Sanders Theater at the ceremony for the dedication of the new medical school buildings. The occasion was a memorable one, and Prof Bowditch's impressive figure, clad in the scarlet robes of the Edinburgh doctorate, and seated at the front of the platform side by side with Dr Warren, made a fitting center for the striking scene.

Prof Bowditch cultivated his friendships in many happy ways, both at his home in Boston and at his summer camp in the Adirondacks. He possessed unfailing courtesy, fairness and good will, warmed by a delightful sense of humor. His ingenuity and effectiveness were manifest not only in physiological research but in matters of affairs. He possessed a rare combination of sober judgment and vigorous will—the qualities of a natural leader.

JAMES JACKSON (1777–1867)^{27-29 30 31 32}

The turning point in clinical medicine from idealism, speculation and theory to accurate and close observation came with the Hunters and Heberden, coincident with the American Revolution, so that when James Jackson received the degree of Bachelor of Physics from Harvard in 1802, the time was ripe for the development of modern medicine.

James Jackson's ancestors migrated to this country in the 1630's and were among the first to settle in Cambridge, a name chosen in honor of the ancient seat of learning in England, the intellectual parent of Harvard College. Thirty-eight Jacksons, all enlisting from the town of Newton, a suburb of Boston, fought in the armies of the Revolution, and fourteen of the descendants were in active service in the Union army during the Civil War of 1861.

Dr Jackson's father, Jonathan, was born in Boston, and moved to Newburyport, a coast town north of Boston, after the death of his parents. He was a public-spirited individual and in 1775 was chosen a representative to the first Continental Congress. Later he was appointed United States marshal for the District of Massachusetts, then including Maine, and superintended the taking of the first census (1790) of that part of New England. For the five years preceding his death in 1810, Jonathan Jackson served as treasurer of Massachusetts and for three years as treasurer of Harvard College.

James Jackson was born in Newburyport in 1777. Later on moving to Boston he attended the Boston Latin School. His medical education commenced in his senior year at Harvard College when

he attended lectures given by the medical professors. Then followed two years of apprenticeship with Dr Edward Augustus Holyoke, of Salem, a remarkably able practitioner, during which time Jackson took the regular course of medical school lectures. In October, 1799, he went to London where he studied with Astley Cooper, Woodville, famous in connection with smallpox vaccination, and other influential men. He renewed his acquaintance with John Collins Warren

library in Boston, and was thought by many to be the outstanding medical man of his day in America.

Dr Jackson, a man of wide culture and remarkable mind was one of the founders of the Massachusetts General Hospital, and for many years he occupied the chair of theory and practice of physic in Harvard. He was one of the first physicians in America to practice vaccination, and made important observations on the nature of typhoid

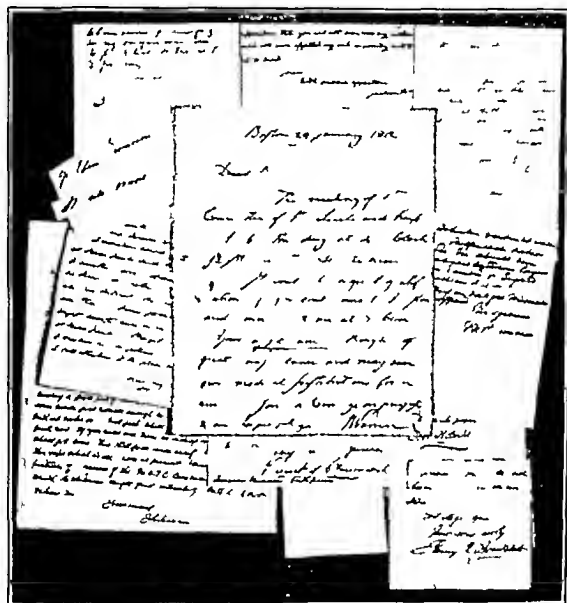


FIGURE 5 Letters of Those Mentioned in This Article
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which ripened into an intimate friendship lasting throughout the latter's life. Their names are united with the development of many progressive accomplishments.

For an American of that day Jackson's medical training was excellent and furnished him with sound background to become a professor. As was the custom of the time, he started practice one and a half years before he received his degree. With John Collins Warren, he was largely responsible in 1803 for furthering the organization of the Massachusetts Medical Society, and in 1808 for preparing its pharmacopoeia. He was also associated with the earliest attempts to form a medical

fever. In 1816 he published a syllabus of his lectures in practice. After his wife's death, he was joined by his son Francis and his family, with whom he lived until his death at ninety years of age. The last year of his life he was an invalid, but until then his mind remained unimpaired. *The Memoirs* of his son and *Letters to a Young Physician* are his literary offerings other than his medical writings.

Oliver Wendell Holmes wrote

James Jackson a man of serene and lean intelligence not ever book-fed truthful to the centre a candid listener to all opinions, a man who forgot himself in his care for others and his love for his profession by com-

mon consent recognized as a model of the wise and good physician I have seen many noted British, French, and American practitioners, but I never saw the man so altogether admirable at the bedside of the sick as Doctor James Jackson. His smile was itself a remedy better than the potable gold and the dissolved pearls that comforted the praecordia of medieval monarchs. To visit with him was a medical education.

JAMES JACKSON, JR (1810-1834)^{28-31 35 36}

James Jackson, Jr, whom Osler called the young Marcellus* among the physicians of this country, —“the young Marcellus, young, but great and good,”—was the fifth child of James and Elizabeth Cabot Jackson.

From the earliest the boy was always cheerful and happy, never long depressed by trouble of any kind. Though industrious and given to systematic habits of study as a youth, he did not achieve any outstanding distinction for scholarship during his college career. Instead of striving for class honors, he devoted himself to a broader reading, and stored his mind with the valuable facts thus acquired. He graduated from Harvard in 1828 at the age of eighteen and then studied medicine under his father and attended lectures at the medical school, making free use of the clinical material at the Massachusetts General Hospital.

In 1831, when just past twenty-one years of age, he went to Europe to continue his studies in the hospitals of Paris, and there for two years under the personal guidance of the great master, Louis, —who had from the first become warmly interested in him and who stood to him ever after as “my second father and God knows that is a name I of all men cannot use lightly,”—he observed and reported his observations.

He chose particularly to follow Louis at La Pitié instead of Chomel at Hôtel Dieu, because the former had not more than fifteen students and visited the wards in the daylight, thus giving him greater opportunity to listen with the stethoscope to more patients, whereas the latter was often surrounded by two or three hundred pupils and made rounds by candlelight one and a half hours before clear day. Jackson felt with Cervantes that “Knowledge of the disease is the beginning of healing.”

Although but twenty-three years old and not yet possessed of his medical degree, James had won a reputation which an experienced physician might have envied. A brilliant career seemed assured to him, and a social life enriched by the affection of a host of friends. He reached home at the end of the summer of 1833, and received

the degree of Doctor of Medicine from Harvard in February, 1834. He was then prepared to engage in practice and, as was the custom in those days, sent an advertisement to the public papers, which appeared on March 5. On the same day he fell ill with a dysentery, which proved fatal about three weeks later.

The blow to the father was a terrible one. But soon he began to collect material for a memoir to his son. In this book are presented his letters to his father, written during the winter of 1831-1832, which are almost wholly given up to enthusiastic descriptions of auscultation and percussion phenomena, histories of cases and arguments of diagnosis, interspersed here and there with illuminating remarks concerning his teachers, his surroundings and himself. From this correspondence, it is clear that the son and father exchanged *cliniques* in their communications as well as personal and domestic matters. There are also included a considerable number of cases of cholera, valuable contributions to the pathology of that disease which James had collected in Paris in the spring of 1832. There is nothing in medical biography so charming as this interchange of scientific interest between the young student, flushed with the excitement of his first great acquisition, and the sympathetic and receptive father in Boston, busy with a great practice and hospital and college duties.

The books were not offered for sale, but copies were sent by Dr. Jackson to his friends and many warm replies were received. My copy is addressed to “Reverend Sewell with Doctor Jackson’s respects.” About these memoirs, Dr. Henry Barton Jacob wrote “I scarcely know any book which is more of an inspiration to the medical students, more of an incentive to hard work and to high ideals, than the little story of the life of this young man.” Quoting Osler again, “I do not know in our profession of a man who died so young who has left so touching a memory.” His name, too, will always be associated with the studies on emphysema, and he is the discoverer of the prolonged expiratory sound in early pulmonary tuberculosis. Greater than these was the influence he exerted on American medicine through his immediate influence on the rising members of the profession of his generation in the habit of thorough observations of the phenomena of disease in the living and in the dead.

OLIVER WENDELL HOLMES (1809-1894)³⁷⁻³⁴

Another of the group which studied with Louis in Paris was Oliver Wendell Holmes, born August 29, 1809, at Cambridge, Massachusetts, one of the

*Marcellus married Julia, daughter of Augustus, after being adopted by Augustus. In line for the throne, he died at the age of twenty years in 23 B.C. He was praised by Virgil.

"Brahmin caste of New England From Phil lips Andover Academy, he entered Harvard in the famous Class of 1829

Turning to medicine, and convinced by a brief experience in Boston that he liked it, he went to Paris in March, 1833, to study. Returning to Boston at the close of 1835, filled with high professional ambition, he sought practice, but achieved only modest success because the grave Bostonians did not think him sufficiently serious. He won a prize, however, for professional progress and lectured on anatomy at Dartmouth. In 1843 he published his essay on the "Contagiousness of Puerperal Fever" which brought him bitter personal abuse, but in due time he was honored as the discoverer of a beneficent truth. The volume of his medical essays holds some of his most scintillating thoughts, his most shrewd observations, his most kindly interest in mankind.

In 1840 he married Amelia Lee Jackson, a cousin of James Jackson, and seven years later he was appointed professor of anatomy and physiology at Harvard, the duties entailing classes also in related departments so that as he said, he occupied not a chair, but a settee in the school. This position he held until 1882. His lectures were fresh, witty and lively, so that the students were sent to him at the end of the day, when they were fagged, since he alone could keep them awake. In later years he made few contributions to medical knowledge, his eager impetuous temperament caused him to leave more patient investigators to push to ultimate results, the suggestions thought out by his fertile and imaginative mind.

We all know him for his *Autocrat of the Breakfast Table* his "One Hoss Shay" and his "Chambered Nautilus." Fortunately, Dr. Holmes's medical essays are reprinted with his works. Several of them are enduring contributions to the questions with which they deal, all should be read carefully by every student of medicine. The essay on "Homeopathy" remains one of the most complete exposures of that therapeutic fad. There is no healthier or more stimulating writer for students and young medical men. With rare humor, with unflinching kindness and with a delicacy of feeling peculiarly his own, he has permanently enriched the literature of the race.

Eight years before his death he made a triumphal tour of Europe and received many degrees. He

died in 1894 and was buried from Kings Chapel, Boston, in the cemetery of Mount Auburn.

Search the ranks of authors since Elia, whom in so many ways Holmes resembled, and to no one else could the beautiful tribute of Landor be transferred with the same sense of propriety.

He leaves behind him freed from grief and fears,
Far nobler things than tears,
The love of friends without a single foe,
Unequaled lot below.

15315 East Jefferson Avenue.

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PRESENT-DAY MEDICAL ECONOMICS^a

An Informal Discussion

REGINALD FITZ, M.D.†

BOSTON

IN 1928, Dr William S Thayer presented my name to the House of Delegates of the American Medical Association as a prospective member of the Council on Medical Education and Hospitals. The House duly ratified this suggestion, and since then I have followed carefully the business of the American Medical Association.

I found myself, *ex officio*, a member of the House of Delegates, and at my initiation into it at Portland, Oregon, in 1929, I attended a medical meeting unlike any other I had previously been to. Here I heard debated by delegates from all over the country a variety of subjects which hitherto had been taken pretty much for granted by my friends in Massachusetts, and yet which appeared to be of considerable concern to doctors from various other parts of the United States. It seemed peculiar, for instance, to bother over the fact that many colleges were beginning to conceive it their function to look after the physical welfare of their students and were establishing well-organized health departments. It seemed of little more than passing interest to be told that the cost of medical care was agitating the public and that in certain sections considerable criticism was being vociferously directed at the medical profession, the feeling being expressed that doctors themselves were largely responsible for the present unsatisfactory situation. Of course I knew that the Committee on the Costs of Medical Care had been organized, and I was acquainted with several of its members. I even looked forward to seeing its report. But I had not stopped to realize that this committee was financed by lay foundations, such as the Twentieth Century Fund, the Milbank Fund and the Rosenwald Fund, nor did I sense the profound influence that money played in the trend of medical philosophy. Since then my education has progressed. I have followed the proceedings of the House of Delegates with much interest, have sat regularly at its sessions and have acquired a kaleidoscopic impression of the confused state of American medicine, which I shall try to describe.

It is difficult to comprehend, if one is living in the midst of an economic thunderstorm, where the lightning strikes, what harm it does and what

scars may be left when the storm passes over. Yet I think everyone will agree that since 1929, and the stock-market crash, the medical profession has survived a violent hurricane, and that in all probability medical practice will never again be quite what it was before the cyclone struck.

In 1930, notable changes had already begun to develop as an aftermath of what was going on in the world. An important event had recently taken place abroad. A public medical-service association had been established in England with a view to setting up a universal medical service, government controlled and available to the entire population. This seemed a disturbing occurrence to certain farsighted people in this country who already knew that in Belgium a similar organization existed, and that doctors there were anything but happy working under it. New developments toward bureaucratic medicine were beginning to be seen here also, various corporations seemed to be entering the practice of medicine, public-health programs were expanding, veterans' legislation appeared to be excessively expensive, some \$30,000,000 had been appropriated within the year to look after veterans of the World War, and it looked as if the federal government soon contemplated going into general practice, particularly as it was constructing hospitals to accommodate veterans suffering from diseases and injuries in no way related to war service.

It was somewhat comforting to learn that the Committee on the Costs of Medical Care had come out with three fundamental principles unanimously agreed on by the entire committee: the personal relation between physician and patient must be preserved in any effective system of medical service, the concept of medical service in a community should include a systematic and intensive use of preventive measures in private practice and effective support of preventive measures in public health work, the medical service in a community should include the necessary facilities for adequate diagnosis and treatment. These three principles were entirely acceptable to the House of Delegates, since for years the American Medical Association had stood out strongly on the desirability of better medicine, and for maintaining the personal relation between doctor and patient.

The years 1932 and 1933, as one looks backward,

^aPresented at the Cambridge Hospital, Cambridge, Massachusetts, January 16, 1940.

†Lecturer on the history of medicine, Harvard Medical School.

were important to American medical economics chiefly because they marked the end of a Republican era in government and the beginning of a Democratic one, and because, politically speaking, they were years of pre-election jockeying. However, in 1932 the House of Delegates was informed that four hundred and thirty organizations in the country were offering or furnishing medical services on a contract basis, and thus it was apparent that experiments along such lines were being conducted busily enough. A new medical economic phenomenon also had appeared on the horizon. This was group hospitalization insurance. While the idea was comparatively new, it was growing rapidly. In fact, by 1933 more than thirty schemes had been proposed to provide for the prepayment purchase of hospital care.

The House of Delegates in 1932 and 1933 was a conservative body. I think that at each session the delegates felt that the financial losses which hospitals had suffered by depreciation in value of their endowments had led hospital trustees and superintendents to be willing to experiment with almost anything that might make both ends meet. In discussing group hospitalization plans in the early days, the opinion was often expressed that many of the proposals for the prepayment of hospital care were not altogether sound. Such proposals seemed on the whole to emanate from persons, not doctors, who were propagandists or promoters looking for profit. Little consideration was given to the personal relation between patient and physician. In certain of the plans, the insurance contracts tended to involve the services of the clinical pathologist, the anesthetist and the roentgenologist, with the implication that these services were at times being exploited to provide an income to the hospital by which to meet deficits in other departments.

And who could tell where the snowball of hospital insurance might roll or to what dimensions it might grow? How soon would the services of the surgeon, the obstetrician and the internist be included, and if so, what was to become of private practice and the personal relation between doctor and patient? How soon would someone in a well-padded political armchair say that voluntary hospital insurance was operating so successfully that compulsory insurance should be put in effect as soon as possible, and that this type of insurance should be placed in the hands of the federal authorities?

The year 1934 was an important one. Mr. Roosevelt had already been inaugurated as president. Shortly afterward, rumors began to circulate that the campaign for a socialized system of furnishing medical care to a large proportion of

the population was about to begin. In June, President Roosevelt announced his intention to propose legislation toward greater economic security for the people of the United States, and indicated, as a primary objective, the care of the unemployed and the aged. A few months later he went on to say that closely related to the broad problem of livelihood was added the problem of security against the major hazards of life: hence, he planned to make definite recommendations which should cover benefits for children, for mothers, for the handicapped, for maternity care and for other aspects of dependency and illness. Very soon the original Wagner bill was introduced, a bill advocating cash payment in partial replacement of wage loss due to sickness, and government controlled insurance for maternity and medical services.

The American Medical Association, before all this came about, had been studying the manner in which compulsory health insurance appeared to operate in those countries adopting it. So far as could be discerned, it did not, on the whole, operate too successfully. It appeared to place in government hands the practice of medicine; health insurance tended to become a political instrument used for the purchase of votes rather than an instrument for improving public health. The result was that the medical service rendered by health insurance tended to become perfunctory and to result in unnecessary treatment. The people who were insured were likely to try to get their money's worth by using doctors unnecessarily. Worst of all the guidance of medicine, of research and of teaching was liable to fall under political rather than professional control and this seemed dangerous to American medicine. For these reasons, early in 1935 at a special meeting, the House of Delegates opposed the Wagner bill and reaffirmed its opposition to all forms of compulsory sickness insurance.

The original Wagner bill was not passed, but another Wagner bill was to be introduced in 1939. Between 1935 and 1939 many things important to medical economics took place. From my own viewpoint, it seems to me that about this time a less conservative attitude in American medicine began to develop. At the meeting of the House of Delegates in 1935, we were told that there were on record seven hundred and forty-eight different schemes of contract practice, and that nearly two hundred different experiments were being conducted in different areas by county medical societies in an effort to organize a more equitable distribution of medical cost. These figures seemed to prove that a great deal of experimentation in medical economics was continuing. As one tries

eled around the country and talked to doctors, one heard it said, again and again, that unless the medical profession developed a feasible plan for the care of the American people, state medicine was inevitable. So keen an observer as the late Dr. J. Tait Mason remarked that there were, at that time, three classes of doctors in the United States: those who felt that the American Medical Association needed better leadership and were inclined to turn up their noses at the way in which the Association was doing things, those a little more cautious who believed that a change in medical care was coming, but who hoped that all that was good and worth while in the present scheme of medical practice might be preserved, and finally, those who admired the conservatism heretofore displayed by the House of Delegates. To these latter men, who seemed to be in the majority, the economic crisis of the last few years had been an unhappy experience, inevitably focusing undue emphasis on the financial aspects of medical work, and leading to rash experimentation or to hasty judgment. These conservatives wished to see preserved, at all costs, the individual private practice of medicine, with free and open competition among physicians and the maintenance of the personal relations between doctor and patient.

Time marched on, restlessness was fomented, experimentation toward socialized medicine continued. In 1935, bills were proposed in seven states looking toward the establishment of compulsory systems of state health insurance, and in 1936 bills were introduced in two more states for the same purpose. In 1937 there appeared, under the auspices of the American Foundation and largely from the pen of Miss Esther Lape, a two-volume book, *American Medicine: Expert testimony out of court*. This book summarized a recent questionnaire circulated among medical men on the organization of medical care in the United States, and was a carefully assembled piece of work. Various problems were discussed in it: the adequacy or inadequacy of medical care, medical education, group practice, state medicine, health insurance and other kindred topics. No conclusions were drawn, but the general tenor of these volumes appeared to show that the present state of medicine was not entirely happy.

I have no idea how many people read Miss Lape's book nor how much influence it had. Probably it attained no general popularity, and was studied not so much by the man in general practice as by the professor in the habit of diffuse reading and abstract thinking, or by persons interested in the theory rather than the practice of medicine.

It seems to me, on the whole, that this book acted like an enzyme, increasing the irritation of the small group of doctors likely to read it who

were by nature truculent, and either indifferent to or dissatisfied with the manner in which the American Medical Association did things. The upshot was that in the fall of 1937 a group of four hundred and thirty such physicians issued their "Principles and Proposals." The principles were four in number: that the health of the people is a direct concern of the government, that a national health policy directed toward all groups of the population should be formulated, that the problem of economic need and the problem of providing adequate medical care were not identical and might require different approaches for their solution, and that in the provision of adequate medical care for the population four types of agency were concerned—voluntary, local, state and federal agencies. The truth of these general principles being assumed, they were implemented by various proposals: preventive medicine should be emphasized, medical indigents should be cared for by public funds, medical education and research should be supported in part by the public treasury, public money should be made available to hospitals that rendered service to the medically indigent, in the allocation of public funds for hospital care, private institutions should be utilized to the largest possible extent, public-health services should be extended by evolutionary processes, and the whole function of the government in relation to health should be consolidated in one separate department.

The strength of the "Principles and Proposals" lay in the fact that they were advocated by honest men of the highest caliber, occupying positions of great responsibility, and with a reputation for leadership in their various provinces. The weakness lay in the fact that the ideas set forth by no means represented public medical opinion. Certainly the House of Delegates did not like them.

In 1938, the House of Delegates realized that new schemes for the organization and distribution of medical services were increasing rapidly, and by then was thoroughly conscious of the fact that the medical profession must play a part in seeking to solve economic problems in relation to illness. For at that time every thinking doctor realized that socioeconomic conditions had become inseparably interwoven with health and sickness and that medical practice had changed. The difficulty was to know exactly the wisest course to pursue.

The delegates felt certain that complete dominance of medical practice by government was unwise. To maintain a personal relation between patient and physician still seemed desirable. The country was so large that no two conditions of medical practice were alike in any two parts of it. No single experiment that had been conducted along the lines of hospital or group health insurance could serve as a model to the whole country.

Most plans on which information was available were conceived with the idea of offering low-cost medical services to special groups of persons. Thus there had grown up, in a comparatively short time and involving many people, a variety of insurance schemes: industrial medicine, health associations for groups of employees and their dependents, student health services, fraternal health associations and sundry other local health insurance plans. Surveys made to throw light on what occurred in the way of results from these endeavors showed that good medical service cost, on the average, twenty-five to thirty dollars per person per year. It seemed hardly possible that any arrangement could lower this average cost and at the same time do good work. Practically all the plans boiled down to being no more than arrangements by which doctors were induced to sell their services to a promoter, who, in turn, resold these services to prospective patients. How happily the doctor came out under any of these systems was not altogether clear, though doctors working for salaries did not seem to complain.

In theory, the idea of collecting the average annual cost of medical services from each of a number of persons, in the hope of relieving a few, is delightfully plausible. There are, however, several objections to it. In the first place, plans that depend on underbidding, advertising or solicitation are hardly to be justified, but how is a promoter to drum up trade without the use of such devices? In the second place, to many doctors the free choice of physicians by patients is desirable, though not so desirable as it had seemed a few years ago, because one of the striking findings of insurance surveys was that only rarely did the persons insured seem to care much whether they could or could not select their doctor. However, plans of insurance which paid medical bills and which permitted free choice of physician and free choice of hospital seemed to be no more expensive and no less efficient than were more exclusive plans in which the choice of physician or hospital was limited. In the third place, a charge must be added to the average cost to each person insured to provide for the administrative expenses in any insurance plan, and the cost of overhead may easily involve a considerable sum. In the fourth place, it is impossible to calculate in advance a premium that will provide for the cost of new developments in medical science, the result being an inevitable collision sooner or later between the resources of the insurance system and the needs of the insured person for new and indeterminate amounts for expensive medical care. The insurance, therefore, might soon cost more than it was worth. In the fifth place, each individual who buys insurance is likely

to try to get back his money's worth. In the sixth place, experience abroad has shown that voluntary organizations under medical control set up to perform the possible functions of a state system of medicine have always drifted inevitably, into compulsory insurance under government control. A skeptic like myself feels, as he hears of a new and successful experiment in group medical insurance, that one more solid brick has been laid on which soon the government will build the superstructure of compulsory health insurance.

The House of Delegates, today, is a different body than it was in 1929 when I sat in it for the first time. A variety of changes have occurred to make the ordinary doctor conscious of the medical economic revolutions through which he has lived in the past decade, and thoroughly sensitive to many influences which were imperceptible a generation ago.

A new Wagner bill was submitted in 1939. It was an offshoot of the so-called National Health Conference held in Washington in July, 1938.

There was a special meeting of the House of Delegates in September, 1938, when the program of the National Health Conference was debated. The delegates decided that several features of the program were admirable; one was unacceptable. They were, for example, sympathetic to the idea of establishing a federal department of health with a representative in the President's cabinet. They believed in efficient and economical expansion of public health or maternal and child health services only, however, so far as such expansion could not be successfully accomplished through the private practitioner. They believed in the expansion of general hospital facilities when need existed, pointing out the desirability of first using existing hospital facilities before erecting new buildings. They believed in the complete care of the medically indigent by tax funds administered by local governmental units. They accepted as useful the principle of hospital insurance, including hospital care only, and not including any type of medical care. They also accepted as useful the principle of cash indemnity insurance to cover the cost of emergency or prolonged illness, provided such schemes complied with state statutes and regulations to guarantee their soundness and the financial responsibility of their underwriters, and provided that they had the approval of the county and state medical societies under which they operated. They approved the principle of insurance against loss of wages during sickness. They did not approve of any system of compulsory health insurance.

When the Wagner Bill was finally written, it appeared a different bill than might have been

expected to develop from the results of the National Health Conference. It had a title which sufficiently stated its purposes: "A bill to provide for the general welfare by enabling the several states to make more adequate provision for public health, prevention and control of disease, maternal and child health services, construction and maintenance of needed hospitals and health centers, care of the sick, disability insurance, training of personnel and for other purposes." In brief, the bill provided federal subsidies through which to induce the states to undertake new activities, and to enlarge activities already under way in certain public-health and medical-service fields. A lot of hospital construction was to be undertaken. The bill proposed to spend \$98,000,000 in 1940, \$123,000,000 in 1941 and \$334,000,000 in 1942. While no specific mention was made of compulsory sickness insurance, the measure introduced the principle of allotment of federal money to individual states for medical care, and was silent as to whether such care should be provided through a state medical service or by a system of state health insurance or by payment of services on a fee basis. (Closely related to this act was the Capper Sickness-Insurance Bill, contemplating a federal appropriation of \$200,000,000 each year to induce the states to develop and maintain systems of health insurance.) None of the suggestions made as the result of the National Health Conference and supported by the House of Delegates appeared to have received much consideration. In fact, the bill appeared bizarre, and contrary in almost every way to the best interests of the health of the American people. The House of Delegates believed that each member of the American Medical Association should oppose it.

Thus, we reach the year 1940 with medical economics still in an unsettled state. The trustees have recently constructed a platform as a guide to indicate the trend which the American Medical Association believes should be followed in the development of health activities and medical care for the people of the United States. The platform

appears fairly to represent what most doctors agree to. It is a simple affair. It advocates the establishment of an agency of federal government under which will be co-ordinated all medical and health functions of the government. It advocates the allotment of such funds as Congress may make available to any state in actual need for the prevention of disease, for promotion of health and for the care of the sick. It advocates the development of a mechanism to expand preventive medical services and to extend medical care for the indigent, with local determination of needs and local control of administration. It advocates the expansion of public-health and medical services in a manner consistent with the American system of democracy. It advocates the utmost utilization of qualified medical and hospital facilities already established. It advocates the continued development of the private practice of medicine. It deplores the introduction of methods such as compulsory sickness insurance or state medicine.

Possibly the last decade has done the medical profession good rather than harm. Certainly, doctors have grown more mindful of the social relations in their work and of the importance of medicine to public welfare. They have become more open-minded, less uncompromising, entirely willing to experiment with plans by which to take care of the indigent and to reduce the cost of medical care. They have become glad to co-operate with the Government in improving public health measures. No longer are they too proud to face the fact that others besides themselves have a stake in the advance of medical education and medical research. The average doctor, however, still believes that medicine is an art and not a trade, that the personal relation between physician and patient is important and that any form of compulsory health insurance will retard the advance of medical knowledge. How much longer the medical profession will maintain its high ideals of self-sacrificing, uncommercial service is a question.

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THE DIAGNOSIS AND TREATMENT OF SIGMOIDAL POLYPS*

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IN RECENT years, considerable attention has been directed to cancerous lesions of the large intestine, and although different types of operations have been employed, the principle of radical removal has been accepted as yielding the best results. Insufficient attention has been paid to the diagnosis and treatment of intestinal polyps, the premalignant lesions, for which radical resections are seldom necessary. It is for this reason that we wish to present our experiences with 10 patients operated on for sigmoidal polyps during the last

Swinton and Warren§ have recently reported the above mentioned series of 156 patients with benign and malignant polyps of the colon and rectum. During the period that these patients were observed, 827 patients were operated on for carcinoma of the colon or rectum. A careful study of these removed lesions showed that 120 (14 per cent) could be proved histologically to have arisen from benign mucosal polyps. In 35 per cent of the cases more than one polyp was found. The polyps were located in the rectosigmoid and rec-

TABLE 1 Summary of Data in 10 Patients with Sigmoidal Polyps

| CASE NO. | AGE | SEX | DURATION OF SYMPTOMS | PRESENT SYMPTOM | MEANS OF DIAGNOSIS | OPERATION | DATE | PATHOLOGICAL REPORT | FOLLOW-UP REPORT |
|----------|-----|-----|----------------------|-----------------------|---|---|----------|--|---|
| 1 | 48 | F | 3 yr. | Bleeding | Sigmoidoscopy, barium enema | Sigmoidectomy | 12/7/32 | Mucosal polyp | Operation for carcinoma of transverse colon on July 3, 1937; other polyps in January 1939 |
| 2 | 68 | F | 9 mo. | Bleeding, diarrhea | Sigmoidoscopy, barium enema | Sigmoidectomy | 10/28/33 | Malignant adenoma | Well in January 1938 |
| 3 | 63 | M | 3 mo. | Bleeding | Sigmoidoscopy | Sigmoidectomy | 1/29/38 | Adenocarcinoma in mucosal polyp | Well on March 15, 1939 |
| 4 | 37 | M | 2 1/2 | Bleeding | Contrast enema | Sigmoidectomy | 5/7/38 | Mucosal polyp | Well on February 21, 1939 |
| 5 | 53 | M | 1 yr. | Bleeding | Sigmoidoscopy | Sigmoidectomy | 5/9/38 | Mucosal polyps with precancerous foci | Well on July 6, 1939; two other polyps surgically |
| 6 | 70 | M | 6 mo. | Bleeding, obstruction | Clinical | Sigmoidectomy | 9/2/38 | Mucosal polyp with focus of malignancy | Well on April 20, 1939 |
| 7 | 75 | M | 15 1/2 | Bleeding | Sigmoidoscopy | Sigmoidectomy | 9/16/38 | Mucosal polyp | Well on February 2, 1939 |
| 8 | 60 | F | 3 yr. | Bleeding | Clinical (sigmoidoscopy twice negative, barium enema, twice negative) | Sigmoidectomy | 10/27/38 | Adenocarcinoma in polyp | Well on August 24, 1939 |
| 9 | 49 | F | 6 yr. | Bleeding | Sigmoidoscopy | Sigmoidectomy | 3/11/39 | Mucosal polyp | Well on July 26, 1939 |
| 10 | 35 | F | 3 mo. | Bleeding, diarrhea | Clinical (barium enema negative) | Sigmoidectomy, supracervical hysterectomy, left salpingo-oophorectomy | 5/1/39 | Mucosal polyp endometriosis | Well on June 1, 1939 |

seven years. During the same period 156 patients with polyps of the colon and rectum were treated, so that the group considered in this paper represents but six per cent of the total cases. The surgical problems incident to treatment of polyps in the colon are quite different from the treatment of those occurring in the rectum below the pelvic peritoneal reflection. The method of treatment of the sigmoidal polyp is the same as that for those occurring in other portions of the colon even though they are infrequent in the proximal portion of the large intestine.

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The frequent occurrence of cancer in patients having congenital polyposis of the colon has long been recognized. In 1932 we proctoscoped 5 adults of one family between the ages of thirty-one and thirty-nine, and found 4 to have congenital polyposis. Three of these subsequently died of cancer, and a fourth died postoperatively following complete colectomy. Two patients had

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§Swinton, N. W., and Warren, S. H. Polyps of the colon and rectum and their relation to malignancy. *J. M. A.* 113:197, 1935, 1939.

multiple malignant foci Within the last six months we have had 2 patients with multiple cancers found at the time of operation, which we believe arose from different polyps One patient had a carcinoma of the splenic flexure and of the sigmoid, while the second had a carcinoma of the cecum and of the transverse colon The routine examination of resected specimens for carcinoma very frequently shows one or more polyps in addition to the cancer A further point substantiating the occurrence of cancer in polyps has been observed in a comparison of the positions of polyps and of cancer In the large series, 68 per cent of the polyps were found in the rectosigmoid and rectum and approximately 60 per cent of the carcinomas of the large intestine observed at the Lahey Clinic occurred in the same location

Bleeding was the presenting symptom in all 10 cases with sigmoidal polyps In 6 cases bleeding had been present for one to fifteen years One patient had symptoms of a moderate obstruction because of the size of the polyp A disturbance of bowel function is unusual and should suggest the presence of malignancy The other symptoms presented by the patients in this series were due to the presence of other conditions

The demonstration of polyps in the sigmoid colon may at times be quite difficult The same diagnostic methods that are used for malignant lesions of the intestine must be employed Proctoscopic and sigmoidoscopic examinations prove of the greatest value, since other polyps may be visualized in the rectum and rectosigmoid, and frequently the sigmoid polyp will be seen It is quite important that these patients be properly prepared before one attempts to carry out sigmoidoscopic examination They should receive 30 or 60 cc of castor oil the evening before examination This is to be followed by cleansing enemas the following morning It is best to have the patient in an inverted position so that the rectosigmoid will become straightened by gravity and the instrument can be passed into the lower sigmoid Close examination of every portion of the mucosa is essential if the small sessile polyps are not to be missed

Following the sigmoidoscopic examination, with the benefit of the preparation stated above, a barium enema is given If the presence of a polyp is suspected, a double-contrast air enema will probably be necessary in order to demonstrate the discrete polyp One x-ray examination may not be successful in outlining the polyp, and in our experience repeated studies have at times been necessary These two methods may not prove the presence of a sigmoidal polyp, even though the history of bleeding is strongly suggestive of its presence In 2 of our 10 cases, abdominal exploration

was carried out to demonstrate the presence of a polyp

The methods of diagnosis, when taken with the clinical story, should be sufficient to exclude the other organic lesions that may be found in the colon One of our patients was operated on with the diagnosis of cancer of the colon, and it is our belief that we cannot exclude cancer in any of these cases preoperatively Ulcerative colitis, diverticulitis, endometriosis with obstruction, benign lesions and tuberculosis, as well as local anorectal conditions and amebic and bacillary dysentery, must be excluded

The treatment of rectal polyps discovered by this routine investigation is a much simpler problem

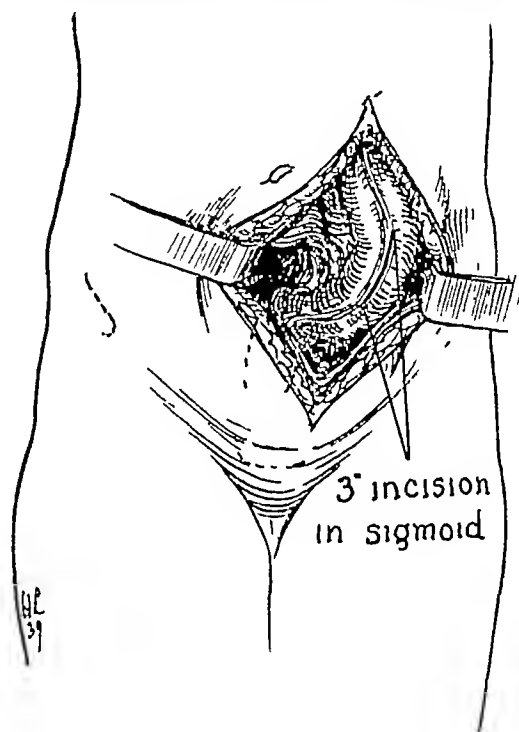


FIGURE 1

The line of incision is made in the longitudinal band

Those below the pelvic peritoneal reflection can be fulgurated under direct vision in one or more stages The patients must be carefully examined subsequently in order to be certain that the mucosa is completely healed It is our strong belief that all polyps in any part of the large intestine, irrespective of size, should be destroyed or removed Those above the pelvic peritoneal reflection can be fulgurated successfully if great care is exercised to avoid perforation and bleeding A long, pedunculated polyp must have the pedicle coagulated by the slow current in order to avoid hemorrhage In 1 of our cases with a high rectosigmoidal polyp serious hemorrhage occurred, necessitating packing of the bowel and later fulguration, two transfusions were necessary for this patient Perforation occurred in 1 case but did not result fatally Signs

of peritoneal irritation are not uncommon, and all these patients should be hospitalized if fulguration is to be done for polyps above the reflection of the peritoneum.

The treatment of sigmoidal polyps is a more serious problem. Hemorrhage following sigmoidoscopic treatment is difficult to control at this level. The danger of perforation of the colon above the peritoneal reflection is evident. It is technically difficult to remove or destroy large sigmoidal polyps through the sigmoidoscope. The problem of dif-

ferentiating the malignant and the benign polyp in the sigmoid should be as close as possible to this position. A longitudinal incision is made through a longitudinal band after carefully walling off this portion of the sigmoid (Fig 1). The incision should be long enough to examine the mucosa for a considerable distance, 3 cm. usually being sufficient. If there is cancerous infiltration of the base or pedicle, the incision in the sigmoid should be closed and resection carried out as for any cancer. If the pedicle is free, the polyp is excised with a generous portion of the mucosa at its base. The mucosal defect need not be sutured. The incision in the sigmoid is then closed with fine, interrupted, silk sutures in two layers (Fig 2). In 4 of our cases this suture line was reinforced with the appendices epiploicae, and in 1 case the entire incision was made extraperitoneal by reflecting a flap of peritoneum from the lateral wall. If the

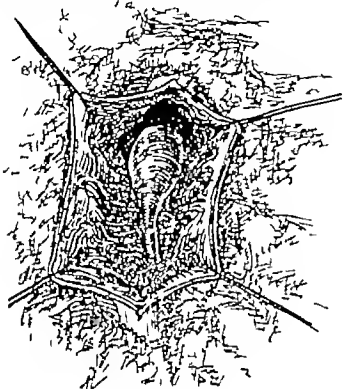


FIGURE 2.

Following the isolation of the operative field with gauze the sigmoid is opened thus exposing the polyp with its base.

ferentiating the malignant and the benign polyp is difficult in this region. Because of these facts we believe that sigmoidal polyps should be removed at laparotomy. The 10 patients in our series had laparotomy with sigmoidotomy. Spinal anesthesia was used for all cases, with a 10 per cent Pontocaine solution—14 to 18 mg. This type of anesthesia provides the best possible operating conditions.

Thorough exploration of the entire colon should first be carried out. If a satisfactory preoperative preparation of the colon has been obtained, there should be little confusion of polyps with fecal masses. They may also be confused with diverticula, but the fixation of the latter in one location and their appearance should make identification possible. Polyps can be palpated through the sigmoidal wall and moved back and forth within the lumen. Induration or fixation of the polyp makes the diagnosis of cancer imperative, necessitating resection. If tension is made on the polyp a dimpling can usually be demonstrated at the point of attachment of the pedicle, and frequently the pedicle itself can be felt. It is important to identify the site of the pedicle, since the incision

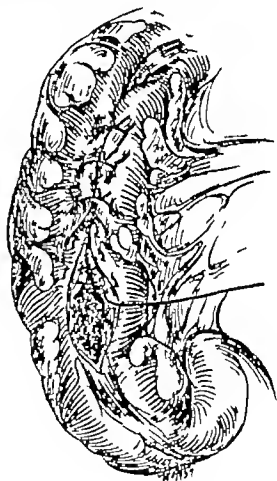


FIGURE 3.

The incision in the wall of the sigmoid is closed with two sets of sutures.

suture line is not satisfactory it should be made extraperitoneal.

Thorough histological study was made of the twelve polyps removed from these 10 patients by sigmoidotomy. One showed a malignant adenoma, and two an adenocarcinoma. Two others contained small foci of malignant change. In none was there any evidence of extension into the pedicle, and in no case could cancer be determined from the gross appearance. Based on our opinion on this experience, we believe that when on complete histological study no evidence of invasion of the pedicle or base is found, radical resection for polyps of this type is unnecessary. The occurrence

of early malignant changes in 5 of the 10 cases is striking evidence of the importance of the removal of all sigmoidal polyps as soon as they are discovered

The postoperative convalescence was satisfactory in all cases, there being no complications and no mortality

All polyps that could be visualized distal to the point from which the sigmoidal polyps were removed were destroyed by fulguration. One patient (Case 1) developed a carcinoma in the transverse colon just distal to the hepatic flexure four and a half years after sigmoidotomy. This was

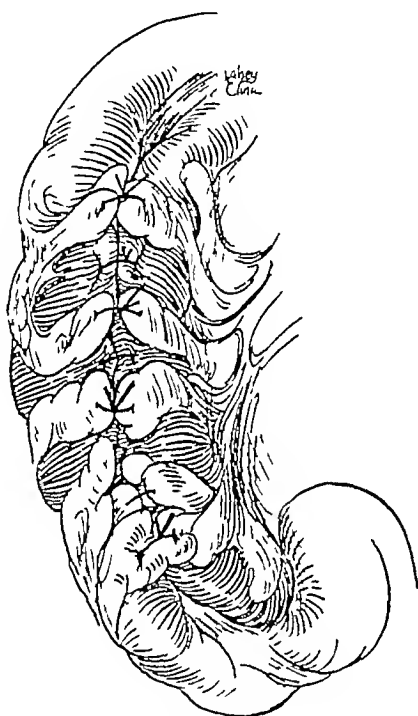


FIGURE 4

The wound is reinforced by suturing appendices epiploicae across the line of the incision

successfully resected by a modified Mikulicz type of resection. The other 9 patients remained well for the period of observation.

Patients who have had polyps in the large intestine should be kept under observation for an indefinite period. Sigmoidoscopic examinations and contrast enemas should be done each year for at least five years. Judging from our experience with carcinoma of the large intestine we believe that observation should be carried out for the same period postoperatively, since these patients are more apt to have subsequent cancer in other portions of the colon than are normal individuals. We have been mainly concerned in the past with observing such patients at regular intervals in order to discover the presence of distant metastases, particularly in the liver, whereas we should be equally concerned with the possible development of a new lesion in the bowel itself.

CASE REPORTS

CASE 1 E W, a 48 year-old, married woman, was first admitted in April, 1929, complaining of symptoms typical of peptic ulcer and rectal bleeding of several years' duration. Complete gastrointestinal x ray and laboratory studies without proctoscopic examination showed a duodenal ulcer. Dietary treatment for ulcer was carried out and the ulcer symptoms were relieved. Rectal bleeding, however, continued. In April, 1930, sigmoidoscopic examination showed two small mucosal polyps at the rectosigmoid juncture for which no treatment was advised. No hemorrhoids or other local anorectal disease was seen.

In December, 1932, because of continued rectal bleeding, contrast air films of the colon following a negative barium enema showed a large, discrete polyp in the upper sigmoid. On December 7 sigmoidotomy and left salpingo-oophorectomy were performed. At operation, palpation of the sigmoid revealed a freely movable, walnut sized tumor, which was attached to a rather long pedicle. A longitudinal incision of the sigmoid was made and the polyp exposed. It was soft and friable and bled easily, and was excised, together with its pedicle. The bowel wall was closed longitudinally, and the suture line reinforced with appendices epiploicae. The left tube and ovary were removed because of the presence of a simple cyst. Pathological examination showed mucosal polyp. Postoperative convalescence was uneventful.

The patient next returned in June, 1937, because of increasing constipation. Barium enemas demonstrated a polypoid lesion in the transverse colon. On July 3 a Mikulicz type of resection of the right colon and right half of the transverse colon was performed. The pathological report showed adenocarcinoma and in addition two benign mucosal polyps. Postoperative convalescence was uneventful. The temporary colostomy was closed 2 months later.

In January, 1939, the patient was having some upper abdominal distress at times, but in general was in excellent condition.

Comment This case is an excellent example of the development of cancer in a patient known to have polyposis of the colon.

CASE 2 L P, a 68-year-old, married woman, was first examined October 10, 1933. The chief complaints were diarrhea and bloody stools of 9 months' duration. Sigmoidoscopic examination revealed a polyp in the lower sigmoid, 2 cm in diameter. Barium enema x ray and contrast air films of the colon were negative.

Sigmoidotomy was performed October 28. At operation a freely movable, walnut sized tumor in the lower sigmoid was palpable. A longitudinal incision in the bowel was made. The tumor was found to be a discrete, freely movable polyp with a long mucosal pedicle. The tumor and pedicle were excised, the bowel wall was closed longitudinally and the abdominal wall closed in layers. Pathological examination showed a malignant adenoma.

The last report from this patient was September 1, 1936, at which time she was perfectly well in every way.

CASE 3 L R, a 63-year-old man, was first examined January 27, 1938, for a chief complaint of rectal bleeding of 2 months' duration. Sigmoidoscopic examination demonstrated a discrete polypoid tumor in the lower sigmoid.

Operation was performed January 29. Palpation of the sigmoid revealed a discrete, freely movable tumor 11 cm. above the peritoneal reflection, with an unusually long pedicle. A longitudinal incision was made in the sigmoid and the polyp exposed. The tip was gangrenous and

was the obvious source of bleeding. The pedicle was 3 cm. in length. The polyp together with its pedicle was removed by the actual cautery. The bowel wall was closed in the longitudinal direction and the line of suture was reinforced with omentum. Pathological examination showed adenocarcinoma arising in a mucosal polyp. Because of the length of the pedicle of this tumor and its obviously benign character it was felt that simple removal was adequate.

Sigmoidoscopic examination made March 15 1939 was negative.

CASE 4 M.S., a 37-year-old man was first examined April 25 1938 because of rectal bleeding of 2 years duration. Sigmoidoscopic examination for a distance of 27 cm. was entirely negative. Barium enema and contrast air films taken after adequate preparation revealed a discrete polyp in the upper sigmoid, and also several areas in the transverse colon that were suggestive but not diagnostic of additional polyps. Re-examination the following day after further preparation of the bowel with castor oil and enemas, corroborated the findings of the sigmoid polyp, but showed that the additional defects in the transverse colon had disappeared.

Operation was performed May 7. Palpation of the sigmoid revealed a polyp 2 cm. in diameter and freely movable, in the midsigmoid. It was delivered through a longitudinal incision and was attached to a pedicle 1.5 cm. in length made up of normal-appearing mucosa. The polyp was clamped and removed and the bowel wall closed in a longitudinal direction. Pathological examination showed a benign mucosal polyp.

On February 21 1939 a sigmoidoscopic examination barium enema and contrast air films showed the entire colon to be negative.

CASE 5 L.Z., a 53-year-old man was first examined May 5 1938, because of rectal bleeding of 1 year's duration. Sigmoidoscopic examination showed a large polypoid lesion with a fairly broad base, 27 cm. from the anal margin. Biopsy showed it to be a benign polyp.

Operation was performed May 9. Palpation of the sigmoid revealed two polypoid masses, one at the midsigmoid and one at the rectosigmoid junction. Both tumors were freely movable. Both polyps were attached by benign pedicles, which were removed, together with the polyps. The sigmoid was closed in a longitudinal direction and reinforced with omentum. Pathological examination showed mucosal polyps with precancerous foci. Convalescence was uneventful.

Proctoscopic examination made July 6 1939 revealed two small mucosal polyps one 10 cm. and the other 17 cm. from the anal margin which were fulgurated.

Comment It is interesting to note that the polyps found at the time of the last examination had not been observed before, although a very careful examination had been made of this area 15 months previously.

CASE 6 H.H., a 70-year-old man was first examined August 29 1938 because of intermittent bleeding and increasing constipation of 6 months duration. Physical examination revealed slight lower-abdominal distention. A clinical diagnosis was made of an obstructing lesion in the sigmoid based on the presence of blood coming down from the sigmoid as seen through the sigmoidoscope.

Operation was performed September 2. Palpation of the sigmoid revealed a freely movable tumor in the descending colon 3 cm. in diameter which was exposed by a longitudinal incision in the bowel. The tumor was attached to a rather short but apparently benign pedicle and was removed together with its pedicle. The bowel wall was closed in a longitudinal direction. Pathological

examination showed a mucosal polyp with a focus of cancer. Convalescence was uneventful.

The patient reported April 20 1939 that he was in excellent condition without intestinal symptoms.

CASE 7 M.M. a 75-year-old man was first examined July 7 1938, primarily because of scatica but with a history of intermittent rectal bleeding of 15 years duration. Abdominal exploration in 1934 had shown no pathologic change in the colon. Barium enema showed a questionable small filling defect at the rectosigmoid. Sigmoidoscopic examination revealed a polyp at this point.

Operation was performed September 16. Palpation of the sigmoid revealed a freely movable, soft tumor in the lower sigmoid attached by a long thin pedicle. The tumor was delivered through a longitudinal incision and removed together with its pedicle. The colon was closed in a longitudinal direction and the suture line extraperitonealized. Pathological examination showed a mucosal polyp. Convalescence was uneventful.

Proctoscopic and barium enema x-ray films of the colon taken February 9 1939 were negative.

CASE 8 L.M. a 60-year-old married woman, was first examined October 21 1938 because of rectal bleeding of 3 years duration. Two barium enema x-ray studies of the colon were negative. Two sigmoidoscopic examinations for a distance of 25 cm. from the anal margin revealed blood in the lower sigmoid but no evidence of organic disease. A clinical diagnosis was made of benign or malignant polyp of the left colon.

Operation was performed October 27 1938. Palpation of the sigmoid revealed a freely movable polyp 2 cm. in diameter attached to a long pedicle with a broad base. A longitudinal incision in the sigmoid revealed the polyp to be friable, soft and apparently benign. The pedicle was clamped at its base and the pedicle and tumor were excised. A longitudinal closure of the bowel wall was made, reinforced by the appendices epiploicae. Pathological examination showed a mucinous adenocarcinoma arising in a mucosal polyp. Histological study of the pedicle showed it to be entirely benign and a resection was not felt indicated. Convalescence was uneventful.

A sigmoidoscopic examination barium enema and contrast air films taken August 25 1939 were negative.

CASE 9 P.P. a 49-year-old married woman, was first examined March 2, 1939 because of rectal bleeding of 6 years duration. Barium enema and contrast air films taken on two occasions were negative. Visualization of the lower sigmoid showed a polypoid tumor 4 cm. in diameter. A specimen taken at biopsy was reported as a benign mucosal polyp.

Operation was performed March 11. A soft, freely movable large polyp in the lower sigmoid was palpated. This was removed together with its base through a longitudinal incision. A smaller polyp lying 2 cm. proximal to this was also found at operation and removed in a similar manner through the same incision. The sigmoid was closed in a longitudinal direction. Pathological examination showed benign mucosal polyps. Convalescence was uneventful.

Sigmoidoscopic examination, barium enema and contrast air studies made July 26 1939 were negative.

CASE 10 I.F. a 35-year-old married woman was first examined April 17 1939 because of a bloody diarrhea of 3 months duration. A barium enema was negative. Sigmoidoscopic examination for a distance of 20 cm. from the anal margin revealed blood coming down from the bowel above this point, but no organic lesion was seen. A clinical diagnosis of polyps of the left colon was made.

Operation was performed May 1. Palpation of the sigmoid revealed a freely movable soft polyp 2 cm. in di-

ameter, in the midsigmoid region. The remainder of the pelvis revealed an extensive endometriosis. A supravaginal hysterectomy and left salpingo-oophorectomy were performed. The sigmoid polyp was then delivered through a longitudinal incision in the midsigmoid. It was attached to a long and benign mucosal pedicle. The polyp together with its pedicle was removed, and the bowel wall was closed in a longitudinal direction. Pathological examination showed endometriosis of the myometrium and a benign mucosal polyp. Convalescence was uneventful.

The patient reported by mail September 15, 1939, that she felt well and had had no intestinal symptoms.

SUMMARY

Ten cases of sigmoidal polyps are reported. Five of the twelve polyps removed showed early malignant changes. The development of cancer from benign mucosal polyps in the colon and rectum is discussed.

Rectal bleeding of unexplained origin suggests the presence of a sigmoidal polyp. Bleeding was the presenting symptom in all our cases. The diagnosis is made by sigmoidoscopic examination, barium enema and contrast air studies.

Sigmoidal polyps should be removed by sigmoidotomy rather than by fulguration through the sigmoidoscope, because of the danger of hemorrhage, perforation and technical difficulties, and because of the difficulty in excluding cancer.

The technic of operation is described.

There was no operative mortality. In 1 case, cancer subsequently developed in the transverse colon. The rest of the patients remained well. Careful follow-up observations by sigmoidoscopic and x-ray studies are recommended.

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DISCUSSION

DR HOWARD M. CLUTE, Boston. One of the early examinations of the American Board of Surgery contained a question which read about as follows:

A man of fifty noticed bleeding from the rectum, and on examination was found to have a rectal polyp. It was removed with a proctoscope, and frozen-section examination showed no cancer. In five or six days, however, when the microscopic studies were more complete, the pathologist noted malignant degeneration. What would you do?

When the board met, someone said, "One of the first things we have to settle is what is the right answer to Question 6." There was a difference of opinion among the members. Some said that they would observe this patient and put radium in the base of the lesion, or cauterize it and proctoscope him every three months. Others felt strongly that he should have immediate abdominoperineal resection of the rectum, since, if there was ever hope of curing cancer of the rectum, this was an ideal case.

I think all of us, when we see a polyp, are very anxious to limit ourselves to removal with a snare or cautery, because we hate to subject the patient to an abdominoperineal resection. However, if there is the slightest question of cancer he must have a radical resection. When one is actually confronted with a case of this sort, however, with such a tiny lesion, it may be difficult to make oneself perform this radical procedure.

I recently examined a patient who a year before had had a small polyp in his rectum, which was removed elsewhere and showed a trace of cancer. When I saw him he was in an inoperable state with cancer of the rectum. Remembering this, when another patient came to me recently with a tiny polyp in her rectum and a biopsy showed adenocarcinoma, I decided on an abdominoperineal resection. The rectum on removal showed a small cancer with no evidence of any metastases. She should be cured, I believe.

This is a most important subject, and Dr. Cattell has covered it quite completely. I think the point he would emphasize, and I should emphasize, is that if one removes a benign polyp one is in danger of having left behind a cancer. The follow-up studies that Dr. Cattell mentions as being done routinely are extremely essential in all these cases.

DR ARTHUR W. ALLEN, Boston. I wish to emphasize one of the statements which Dr. Cattell has made. One must not try to remove these sigmoidal polyps from below. If one uses a small loop for lesions above the pelvic floor, one is very likely to get into trouble, as the loop may easily burn through the bowel into the peritoneal cavity.

So far as the radical operation on these early cases of cancer of the bowel is concerned, I am absolutely in accord with Dr. Clute. If we are to cure cancer of the bowel these early lesions must be attacked radically. It is perfectly true that some patients with low-grade cancer in a polyp in the colon or rectum may not develop a recurrence in later life if a simple removal of the polyp is done. On the other hand, the polyps certainly recur on occasion, and I believe that our best opportunity to cure this disease is in the early cases.

I was interested in Dr. Cattell's statement concerning the ratio of large bowel lesions to rectal lesions. He asserts that they have approximately 3 cases of large bowel carcinoma to 7 of carcinoma of the rectum. In a recent series of such cases that I have just begun to study at the Massachusetts General Hospital, we found 634 cases of carcinoma of the colon to 818 cases of carcinoma of the rectum. Thus you see we have a ratio of 6 to 8. In the *United States Public Health Service Reports* for 1936 there were recorded approximately 15,000 deaths from carcinoma of the colon, as against less than 8,000 deaths from carcinoma of the rectum. I believe the answer to this variation is that at present more surgeons will operate on patients with carcinoma of the colon than will undertake the combined abdominoperineal operation for carcinoma of the rectum.

One other question is that of Devine's defunctioning operation prior to the removal of a lesion lower down in the colon. This procedure is becoming popular, and I should like to suggest that we try to make our defunctioning colostomies, if possible, in the left upper quadrant, using the splenic flexure, and leaving the right upper quadrant free of adhesions, since this area may be needed for surgery on the gall bladder or stomach later in life.

DR CATTELL (closing). The published figures on the site of polyps of the large intestine vary greatly, probably because there is no uniformity in dividing the large intestine into the colonic and rectal segments. In our figures we include rectosigmoidal with rectal polyps, and this accounts for the high proportion reported in this area.

Dr. Allen and Dr. Clute have emphasized the importance of resection in cases of definite carcinoma even though it is early carcinoma. We are in complete agreement with this. However, if the cancer is confined to the periphery of the polyp and the pedicle is negative, complete excision of the polyp will be sufficient if these cases are followed carefully.

THE TREATMENT OF RHEUMATOID ARTHRITIS WITH SULFUR*

A Critical Evaluation

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PATIENTS with chronic diseases of unknown etiology are frequently subjected to various therapeutic procedures that are of questionable merit and are usually based on conjecture. Such supposedly curative or ameliorative measures are regularly administered to patients with chronic rheumatoid arthritis, often at considerable expense, not infrequently with resulting complications, occasionally even death, and generally without material benefit to the patient. This state of affairs is due in part to the fact that patients with chronic diseases often demand treatment. They are ever hopeful that each new form of therapy prescribed will be as specifically curative as the adverse claims. There are, however, other causes for the continued prescribing of many useless anti-rheumatic remedies. The premature publication of poorly controlled studies acclaiming great therapeutic benefit and voluminous medical advertising constantly confront the busy practitioner of medicine. He possesses neither the time nor the facilities to investigate adequately the claims made. Except for the reports of the Council on Pharmacy and Chemistry of the American Medical Association, its "Queries and Minor Notes" columns and the all too infrequent publications concerning the repudiation of previously published premature claims, the busy physician has no way of determining the respective merits of many of the therapeutic procedures.

The parenteral administration of colloidal sulfur represents one of the more recently advocated forms of therapy for patients with rheumatoid arthritis, and has been acclaimed by many.¹⁻¹² Favorable results have been reported in 30 to 100 per cent of the cases so treated.¹⁻¹² Excerpts from some of these reports read as follows: "good results"—"a valuable agent in the treatment of certain types of arthritis"—"All the cases were objectively improved as judged by subsidence of swelling, relief of muscle spasm, decrease of thickening of joint capsule (when palpable), disappearance of any increased local temperature, de-

crease in tenderness, increase or return to normal range of motion and decrease in deformity." Woldenberg⁴ observed improvement in all of 250 patients with rheumatoid arthritis so treated. He reports disappearance of pain and muscle spasm following the fifth or sixth injection, and disappearance of joint effusions after the third or fourth week. Such enthusiastic reports naturally attract the attention of physicians. In fact, many might think that they were guilty of neglect if they withheld such supposedly beneficial therapy from their patients with rheumatoid arthritis. The physician's suspicion of the newly heralded rheumatic remedy should be aroused when he learns that therapeutic benefits are observed in patients with either degenerative joint disease (hypertrophic arthritis or osteoarthritis) or rheumatoid arthritis. These two types of arthritis are distinct disease entities, in no way causally related. Therefore, it would be most surprising to learn that the same therapeutic agent cured both diseases. A few reports concerning sulfur therapy have been unfavorable.¹³⁻¹⁵ In such publications, one reads such comments as "absolutely without effect," and "little or no improvement."

Recently, evidence has been presented in an attempt to place the treatment of rheumatoid arthritis with sulfur on a rational basis. This evidence has included an increased sulfur excretion,^{9, 19, 20} a reduced cystine content of the finger nails,^{2, 4-6} a decreased sulfur content in the articular cartilage²¹ and the need for a detoxifying agent.¹² Despite the presentation of these data, it will be shown that it is still impossible to prove the existence of a primary disturbance in sulfur metabolism in patients suffering with rheumatoid arthritis.

A negative sulfur balance was observed in 2 patients with rheumatoid arthritis, carefully studied by Goldthwait, Painter and Osgood.¹⁰ No control subjects were similarly studied. Cawadias⁹ reports an increased urinary excretion of sulfate, phenylsulfates and incompletely oxidized sulfur in all cases of "subacute rheumatism studied. Race,²⁰ however notes an increased excretion of unoxidized sulfur in only 20 of 42 cases of 'rheumatoid conditions,' all of which showed positive sulfur balances. This author stresses the fact that the above finding was difficult to interpret because

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 ‡The expenses of this investigation have been defrayed by the John and Mary E. Martie Foundation and the Commonwealth Fund.
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of failure to study comparable controls. Subsequently, Senturia²² was unable to demonstrate either an abnormal partition or the excretion of sulfur in the urine of arthritic patients.

The finding of a reduced cystine content in the fingernails has been cited repeatedly as signifying the existence of a sulfur deficiency.^{1 4-6 8 23} Many of the earlier reports¹³ concerning this abnormality are of questionable significance because of the method used in making such determinations. The fact that patients suffering from other diseases—carcinomatosis, prolonged fevers and so forth—exhibit lowered cystine content of the fingernails should cause one to be extremely skeptical of the value of such determinations in judging either the indication for, or the benefits to be derived from, sulfur therapy. Furthermore, some workers^{13 24} have stated that a large percentage of patients with rheumatoid arthritis do not show this abnormality. In addition, it has been claimed that rheumatoid arthritic patients may improve with sulfur therapy, even though the fingernail cystine content was normal, or failed to return to normal when such treatment was administered.¹³ Race²⁵ was the first to suggest that this phenomenon did not represent a primary disturbance of sulfur metabolism. He called attention to the fact that the cystine content of globulin was lower than that of albumin. This being the case, he thought it extremely probable that the reduced cystine content of the fingernails was a reflection of the altered plasma proteins, namely a reduced albumin-globulin ratio, so frequently observed in patients with rheumatoid arthritis.

The evidence suggesting that the sulfur content of articular cartilage is reduced in patients with rheumatoid arthritis is meager and not well established.²¹ Despite this fact, one author⁸ has suggested, without further proof, that at least some, if not all, forms of arthritis are made possible because of an existing sulfur deficiency. This assumption is most untenable, because the available data must be interpreted as meaning that a sulfur deficiency does not exist.

Forbes and Neale,¹² having demonstrated that the intra-articular injection of indole results in a chronic arthritis, and having observed the elimination of indole in the urine of 34 of 35 patients with arthritis (rheumatoid, hypertrophic and mixed arthritis), advocate the administration of sulfur in various types of arthritis. These authors failed to stress the fact that the intra-articular injection of many innocuous agents will produce a chronic arthritis. Their failure to separate the various types of arthritis indicates that the authors are of the opinion that sulfur deficiency, and in consequence failure to detoxicate indole, are of

primary importance in the production of various types of arthritis. The data thus far presented do not warrant such conclusions.

In view of the above-mentioned data, and the carefully controlled metabolic studies of Frberg, Block and Fromer, which have recently been presented in abstract form,²⁶ it must be concluded that the administration of sulfur to patients with rheumatoid arthritis is not based on scientific fact. It has been our purpose to evaluate, as critically possible, results of colloidal sulfur therapy in a small, carefully studied and well-controlled group of patients with unquestioned rheumatoid arthritis.

METHODS OF STUDY

We²⁷ have previously stated that in a chronic disease of unknown etiology, such as rheumatoid arthritis, characterized by spontaneous remissions, it is extremely difficult to evaluate the results of therapy with any degree of certainty unless the studies are rigidly controlled. Because of the marked variations in the course of the disease from case to case, each patient must be made to serve as his own control. If studies pertaining to the evaluation of therapeutic procedures are not conducted in this manner, one is very apt to conclude that the improvement observed is the result of therapy, whereas it may actually represent a natural variation in the course of the disease. Such a controlled study can be made only by choosing patients whose clinical course and variations in sedimentation rate have been known for months or years prior to the institution of a new form of therapy. An adequate follow-up period is most essential so that one can decide as to the permanency of any improvement noted during the period of therapy. In addition to the above precautions, it is extremely important that the patients be kept on the same basic regime before, during and after the administration of the therapy being evaluated. Every available means should be employed in evaluating clinical improvement. We record separately the subjective, objective and laboratory evidence of improvement, the final result being based on all three. This method of recording enables one to establish more accurately what, if any, psychic effect must be taken into account in the final summation. In all fairness to the type of therapy being studied, only patients whose disease state is active and still reversible should be selected. One must also realize that the early and atypical cases are more apt to show remissions than are the more typical cases which have been more or less stationary for a long time. If the administration of a given form of treatment should result regularly in improvement in this latter group, one might have reason

TABLE 1 DATA ON ALL CASES

| Case* | Sex | Age | CHARACTERIZATION OF AILMENT At Onset At Present | Time Before Therapy | Course | Amount of Sodium Given mg | AL Type of Anemia | Effects Subjective | Die of Therapy Subjective | Results | Comments |
|-------|-----|-----|---|---------------------------|--------|--|-------------------------|-----------------------|--|-----------|--|
| 13 | F | 45 | Mild to Moderate | Moderate | 2 yr | Many good and bad periods, influenced by emotional upsets | 320 | 1 urticaria | Less fatigue and pain | No change | Slowly slight subjective improvement, but no objective gain seen. Had an exacerbation 3 months later. |
| 52 | F | 32 | Moderate | Moderate | 15 mo. | Stationary | 320† | 1 urticaria | Less fatigue and pain | No change | Patient remarked that results were not so beneficial with second course. |
| 116 | F | 39 | Moderate | Moderate | 1 yr | Stationary pain most marked in evening | 310 | 1 urticaria | No change | No change | Subjectively improved. No objective change. After 2 yr. later patient had an exacerbation and ing new joint & well as old. |
| 181 | F | 28 | Mild | Mild | 5 yr | Spontaneous remissions and exacerbations, stationary for past 9 months | 320 | 1 urticaria | No change | No change | N change. Often had to go to bed because of arthritis both during and after course of treatment. |
| 188 | M | 47 | Mild | Moderate | 5 yr | Stationary | 370 | 1 urticaria | Joint is more comfortable | No change | N objective gain seen. Patient believed that he was "helped a little." |
| 203 | F | 31 | Extensive | Moderate | 2 yr | Slowly progressive | 160 | 1 urticaria | No change | No change | N objective gain seen. Patient believed that he was "helped a little." |
| 213 | F | 31 | Mild | Moderate | 4 mo. | Steadily progressive | 370 | 1 urticaria | No change | No change | N objective gain seen. Patient believed that he was "helped a little." |
| 225 | F | 53 | Mild | Moderate | 3 yr | Stationary | 360 | 1 urticaria | Stronger better pain | N change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| 229 | F | 49 | Mild | Moderate | 4 yr | Stationary | 370 | 1 urticaria | Pain stronger and had less pain worse during final week of treatment | N change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| 279 | F | 57 | Extensive | Moderate | 1 yr | Stationary | 320 | 1 urticaria | No change | N change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| M. A. | F | 43 | Moderate | Moderate | 2 yr | Steadily progressive | 340 | 1 urticaria | Better, less second person, much stronger | No change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| D. Z. | F | 45 | Mild | Mild | 2 yr | Stationary | 350 | 1 urticaria | Slight improvement, mainly in evening | N change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| 313† | M | 55 | Extensive | Moderate | 4 mo. | Progressive | 1080 | 1 urticaria | No change | N change | N slight subjective improvement. One day joint became inflamed while under treatment. |
| O. L. | M | 57 | Moderate | Moderate | 1 yr | Stationary | 2580 | 1 urticaria | No change | No change | N slight subjective improvement. One day joint became inflamed while under treatment. |

*Case numbers refer to patients with rheumatoid arthritis who have been studied in detail in the book and will be used in all subsequent publications. Cases listed by initials are patients of one of us (W. B.)

†Second course of treatment.

‡This patient had been given 80 mg previous to this course.

§Includes complete remissions. Present attack of 2 yr. duration.

Treatment of 1160 mg given followed by rest period of 1 mo., then total of 1900 mg. administered.

to suspect that one was dealing with a specific form of therapy

In the present series of patients, all but 2 had been observed for periods varying from one to five years before sulfur therapy was instituted. The two exceptions (Cases 213 and 353) had been on an established basic regime for months prior to hospitalization, without obtaining any appreciable effect. The same basic regime of a high-vitamin, high-caloric diet, added vitamins in the form of cod-liver oil and yeast, daily physiotherapy and constant rations of acetylsalicylic acid, allowed during the pretreatment period, was continued during the sulfur therapy and post-treatment periods.

Fourteen patients—12 ambulatory and 2 hospitalized—were studied. Two of these (Cases 13 and B Z) received two series of injections. Colloidal sulfur in the form of Sulisocol* was given intravenously to 12 patients (fourteen courses) and intramuscularly to 2. Ten patients received a total of 310 to 370 mg of colloidal sulfur over a period of six to eight weeks. One patient became discouraged and discontinued treatment after 160 mg had been given. In order to establish that larger doses (1000 mg or more) were no more efficacious than the previously mentioned smaller ones, 3 patients were given 1080, 1200 and 2980 mg respectively. Twenty milligrams was administered as an initial dose, except for 2 of the patients receiving the larger doses, who received 30 mg initially. Subsequent injections of 30 mg each were given to all patients except those receiving the larger doses. In the latter cases 50 mg was given as a second dose and 100 mg subsequently.

RESULTS

The results of sulfur therapy, as well as a brief clinical résumé of each patient's history, are contained in Table 1. In no case were any toxic symptoms observed. In an occasional case the solution being injected escaped into the subcutaneous tissue, with resultant burning and redness, which subsided quickly with the application of hot dressings. Sloughing of the skin was never observed. In 2 cases a brownish pigment appeared over the dorsum and the palmar surface of the hands. This may have represented a manifestation of the disease.

Subjective improvement, consisting of increased strength and less joint pain, was noted after eight (50 per cent) of the sixteen courses of treatment in the 14 patients. No patient, however, improved objectively. Of the patients subjectively improved, 1 (Case 52) experienced an exacerbation as the course of therapy was being completed. In 1 case

(Case 229) the effect was probably largely psychic, in that improvement was always noted within thirty minutes after receiving the injection and lasted only twelve to forty-eight hours. During the last week of therapy, this patient suffered from a severe exacerbation of her arthritis, involving new as well as previously affected joints. In only 1 case (Case M A) did the subjective improvement last longer than three months. Two patients who improved subjectively following the first series of injections soon experienced exacerbations. In one of these (Case B Z) there was no improvement, in the other (Case 13) the patient improved only slightly with an additional course of therapy.

It has long been our opinion that the corrected sedimentation rate²⁸ is the most reliable single test for determining the activity of rheumatoid arthritis²⁹. When performed at regular intervals, it can often be relied on to measure more accurately the activity of the disease than does the physical examination. As can be seen from Table 2, this test

TABLE 2 Sedimentation Rates Observed in Patients Receiving Colloidal Sulfur

| CASE | CONTROL PERIOD* | | | IMMEDIATELY AFTER TREATMENT | FOLLOW UP RATES | | | |
|--------------------|-----------------|------|------|-----------------------------|-----------------|------|------|------|
| | HIGH | LOW | LAST | | 1 MO | 2 MO | 3 MO | 6 MO |
| | mm | mm | mm | mm | mm | mm | mm | mm |
| 13 (first course) | 1.27 | .85 | 1.02 | 0.94 | 0.92 | — | 0.80 | 1.01 |
| 13 (second course) | 0.94 | 0.86 | 0.86 | 1.06 | — | — | 0.89 | 0.96 |
| 52 | 1.09 | 0.70 | 0.86 | 0.82 | 0.89 | 1.27 | — | 0.96 |
| 116 | 0.83 | 0.60 | 0.69 | 0.55 | — | — | 0.42 | 0.69 |
| 181 | 1.91 | 1.50 | 1.91 | 1.66 | 1.52 | 1.82 | — | 1.95 |
| 188 | 1.48 | 1.14 | 1.48 | 1.04 | — | — | — | 1.07 |
| 213 | 1.63 | 1.47 | 1.63 | 1.57 | 1.67 | 1.66 | 1.45 | 1.16 |
| 225 | 1.13 | 0.90 | 1.13 | 0.92 | 1.16 | — | — | 0.94 |
| 229 | 0.70 | 0.68 | 0.70 | 1.12 | 0.84 | 0.71 | 0.59 | 0.6 |
| 353 | 0.72 | 0.71 | 0.72 | 0.94 | 0.92 | 0.83 | 0.73 | 0.74 |
| M A | 1.52 | 0.95 | 1.52 | 0.97 | — | — | 1.02 | 0.79 |

*Sedimentation rates for the control periods represent the variations for the preceding six months except for Cases 188 and 213 in which the rates cover only two months and Cases 225 and 353 one month. The rates are expressed in millimeters per minute the upper limit of normal being 0.40

was performed at regular intervals before, during and after therapy in 10 cases receiving eleven courses. We used the same criteria for judging improvement, as measured by the sedimentation rate, previously described²⁷. A drop of 0.15 mm per second was considered significant when the initial rate varied from 0.5 to 1.0 mm per minute. A drop of 0.2 mm per second was judged significant if the initial rate varied from 1.0 to 1.5 mm per minute, whereas a drop of 0.3 mm per second was considered significant if the initial rate exceeded 1.5 mm per minute.

Employing these criteria, only 3 patients (Cases 188, 225 and M A), showed significant drops in the sedimentation rate. In 2 of these (Cases 225 and M A) the decreased rate accompanied subjective improvement. In the third, the rate re-

*Supplied through the courtesy of Drug Products Company Incorporated Long Island New York

turned to the pretreatment level one month after therapy was completed. The lowered rates in Cases 225 and M A were maintained for twelve and eighteen months, respectively, despite the fact that objective improvement was not noted. In no case did the sedimentation rate return to normal.

Discussion

From the above results it seems reasonable to conclude that colloidal sulfur, even when administered in large doses, does not alter the course of rheumatoid arthritis. While the number of cases so treated is small, the uniformity of the results renders them significant.

It will be of interest to those workers who have contended that a primary sulfur disturbance exists in patients with rheumatoid arthritis to learn of the results obtained by Freyberg, Block and Fromer¹⁶ in carefully executed metabolic experiments carried out on patients with rheumatoid arthritis and on control subjects. Their results show that there exists no fundamental difference in the amount of sulfur excreted or the manner in which it is excreted by arthritics and by control subjects.

The injection of colloidal sulfur affected the metabolism and excretion of sulfur in patients with rheumatoid arthritis in the same way as it did in normal individuals. When injected intravenously the sulfur excretion in all but one patient increased by amounts considerably greater than the amount of sulfur injected. Thus the injection of colloidal sulfur actually created a deficiency of sulfur. Obviously then, this method of treatment could not be expected to prevent or diminish a deficiency of sulfur in the body if such deficiency existed. Injected sulfur was eliminated chiefly as inorganic sulfate; there was no important increase in the conjugation of sulfur and hence no benefit could result by conjugation of toxic substances. Sulfur given orally in colloidal form and as sodium thiosulfate effected the same changes in the arthritics as in the normal individuals; there was no increase in conjugation of sulfur. Thymol was readily conjugated with sulfuric acid by the arthritic patients and the controls similarly, thus indicating no impairment of this detoxifying mechanism and no need for sulfur medication on this account. Our analysis of fingernails showed no changes in the cystine content after sulfur medication.

These same authors conclude

No evidence of sulfur deficiency or abnormality in sulfur metabolism was found to exist in patients with rheumatoid arthritis. The data of this study reveal no biochemical or metabolic indication of need for or benefit from sulfur medication in the treatment of rheumatoid arthritis.

From the above, it appears that the physician who fails to administer colloidal sulfur to a patient with rheumatoid arthritis is not guilty of neglect. Colloidal sulfur therapy represents another anti-rheumatic remedy which can be dispensed with in the treatment of rheumatoid arthritis, with con-

siderable saving of expense to the patient. Milder toxic reactions have been observed. One must further realize that the administration of any therapy intravenously is not without danger.

The data contained herein are in agreement with the action taken by the Council on Pharmacy and Chemistry of the American Medical Association,¹⁷ which has been unwilling to include in its list of approved new and non-official remedies any of the colloidal sulfur preparations now on the market. The Council stated that such a product was not acceptable because of the lack of evidence of its therapeutic value.

SUMMARY

Evidence is cited which proves that a primary disturbance of sulfur metabolism does not exist in patients with rheumatoid arthritis.

Data are presented showing that the administration of colloidal sulfur in small or large doses does not alter the course of rheumatoid arthritis, as measured by objective or laboratory evidence of improvement in well-controlled cases.

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REPORT ON MEDICAL PROGRESS

SURGERY OF THE SYMPATHETIC NERVOUS SYSTEM, WITH PARTICULAR REFERENCE TO VASCULAR DISEASE

REGINALD H SMITHWICK, M D *

BOSTON

INTERRUPTION of sympathetic pathways in man is extremely helpful in the treatment of many disorders, particularly those involving the vascular system. This field is a very open one, especially as far as etiologic factors are concerned. In many disorders amenable to treatment by sympathectomy, the question may be raised as to whether they are due to disease of the arteries themselves, or whether increased sympathetic outflow actually exists, and in turn results in diminished blood flow to the part, and later in pathologic changes in the arteries. In other words, is one dealing with primary vascular disease or with a lesion of neurogenic origin? In this connection one might refer to the long-standing disagreement concerning the etiology of Raynaud's disease. Much of the evidence available on this matter may be utilized in support of either viewpoint. The difficulty is that no conclusive data exist, because most methods of study involve a measurement of the sum total effect of vascular disease and sympathetic influence. The matter can be settled only by separating the two, and by demonstrating conclusively that increased sympathetic motor impulses either are or are not present. There is a tendency, by those who favor the vascular theory of origin, to conclude or imply that sympathectomy is therefore not indicated as a form of treatment. This often applies to their attitude toward the indications for sympathectomy for vascular disease in general. They appear to hold that because a disease may not be neurogenic in origin, interruption of sympathetic pathways is illogical. In the matter under discussion, Sir Thomas Lewis,¹⁻³ the most steadfast and devout exponent of the "local fault" theory, believes nevertheless that sympathectomy, particularly the preganglionic

type, is the treatment of choice for this disorder. All who are familiar with the benefit which follows a properly executed sympathectomy will agree.

The effect of extensive sympathectomy in animals is always a source of interest, and yields information that may be of help in the understanding of disease in man. One must be cautious, however, in the interest of the patient, in concluding that the effect of sympathectomy on normal animals will be the same in human subjects with disease. Conversely, one must not be too hasty in assuming that the effect of sympathectomy in animals with induced disease, not identical with that found in man, will necessarily be duplicated in the latter. Particularly dangerous is a tendency by some to work out anatomic pathways in man by inferences drawn from animal investigation.

One always turns with interest to the report by Cannon and his co-workers of their experience with ablation of sympathetic influence in animals. Of particular interest is the striking difference in the effect of total sympathectomy in the cat and in the dog. This matter has recently been discussed in a series of articles⁴⁻⁸ showing that a cat devoid of its sympathetic nervous system is extremely sensitive to heat and cold, to anoxemia, to blood loss and particularly to muscular exercise. A dog, on the other hand, responds in an almost normal manner under these same conditions. Both cats and dogs are alike in being extremely sensitive to insulin after sympathectomy.

These findings serve to emphasize the danger of drawing conclusions by inference, even among animals of different species. It would appear even more questionable to conclude what the effect of sympathectomy would be in man from experimental work carried out in animals. Most authorities agree that the effect of elimination of

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sympathetic influence in man had best be determined by a careful study of the end results of various procedures as applied to man, rather than by inference from animal experimentation

The technic of sympathectomy, as related to the extremities, in man is now well standardized. As a result of many years of trial and error, operations have been devised to fulfill certain necessary qualifications. These have been set up and determined by a close comparison of the end results of different procedures. Sympathectomy is followed by the best clinical results when the area in question is thoroughly denervated, by preganglionic rather than postganglionic section. Care must be taken to guard against regeneration of interrupted pathways, in order that the late results may not suffer by comparison with the satisfactory immediate effects. Reference is made to the technic that best fulfills these qualifications.⁷ While to perform these operations requires specialized knowledge and training, they carry a minimal risk to the patient, short periods of disability and no serious untoward effects. Preoperative studies make it possible to predict the result to be expected with a high degree of accuracy. Clinical experience is also important in this regard.

CIRCULATORY DISORDERS OF THE EXTREMITIES

Particularly useful is sympathetic denervation of the extremities for circulatory disorders. These may be chiefly vasospastic in nature (Raynaud's disease), with undemonstrable to moderate or organic changes in the arterioles. The earlier sympathectomy is performed, the better the result. In such cases, spasm in response to cold, pain and emotion is virtually eliminated, blood flow is greatly increased and the symptomatic relief is impressive. When local tissue damage already exists, the operation results in increased tolerance to cold and shorter, less intense periods of vasoconstriction. Similar relief follows sympathectomy for vascular spasm secondary to underlying disease such as anterior poliomyelitis, thromboangiitis obliterans and certain of the causalgias. The cold, blue, cyanotic extremity with chronic or persistent ulceration that sometimes follows infantile paralysis may be rendered warm, dry and pink by sympathectomy. In young children where a discrepancy in the rate of growth of the two extremities exists, sympathectomy may be utilized to decrease the eventual difference in the length of the two limbs. As an adjunct to the treatment of thromboangiitis obliterans, the value of sympathectomy should not be underestimated. It has been a highly significant factor in the reduction of the incidence of major amputations in this disease, from approx-

mately 75 per cent fifteen years ago to 6 per cent at the present time.

Under the diagnosis of causalgia, certain patients are grouped who suffer from painful lesions of the digits or extremities resulting from old injuries or infections. The extremity is cold, cyanotic and extremely sensitive. A tender, scarred amputation stump may be present. If temporary relief of pain with improved circulation follows paravertebral novocain block, sympathectomy has been found to be extremely valuable in the rehabilitation of such patients. If the local fault is great, reamputation may also be necessary. The latter is not successful as a rule, unless the circulation is first restored by sympathetic denervation.

The importance of reflex vascular spasm as associated with sudden occlusion of peripheral arteries should be emphasized. This applies particularly to embolic occlusion and also to sudden thrombosis. The entire peripheral vascular tree constricts reflexly under these circumstances. This hinders the development of collateral circulation, and is a vital factor in the high incidence of major amputations after occlusion of large arteries such as the femoral. A similar mechanism is present following injuries of main arteries by laceration and gunshot wounds. In the upper extremity, occlusion of the brachial artery may be related to cervical ribs, anomalous first ribs and the scalenus anticus syndrome. More recently, the importance of reflex vascular spasm and its relation to acute thrombophlebitis of femoral and iliac veins have been stressed by Ochsner and DeBakey.⁸ In all the above conditions this reflex may be abolished by repeated paravertebral novocain block by paravertebral alcohol injection or by sympathectomy when feasible and necessary.

The gratifying relief afforded by sympathectomy to those who suffer from extreme and uncontrolled perspiration of the extremities (hyperhidrosis) has been re-emphasized by White.⁹ In this disease, excessive activity of the sweat glands is presumably neurogenic in origin. Increased vasoconstriction does not necessarily accompany the increased sudomotor activity. Because sympathectomy is followed by complete abolition of sudomotor reflexes, the clinical result is impressive. The hands or feet are rendered dry and warm.

HYPERTENSION

This very important manifestation of disease is one of the most discussed problems in medicine today. It is well that this is the case for there are few matters of greater consequence to man. The cause of high blood pressure in a certain group of patients who are classified as suffering from

essential hypertension is still unknown. That high blood pressure may result from intracranial lesions, from arteriosclerosis, from tumors of endocrine glands, more particularly the basophilic adenoma of the pituitary and the medullary adrenal neoplasms, and from renal disease, polycystic kidneys, embryomas and pyelonephritis, as well as from other causes, is well known.

It is obviously highly desirable that a patient with hypertension be studied in a detailed manner and that all possible known causes of hypertension be excluded. The brilliant researches of Goldblatt, Kahn and Hanzel¹⁰ have served to focus attention on the kidney, and as a result a certain group of patients can be segregated who will benefit by the correction of renal disease. As yet there are few such examples on record, but others will appear in time. It would seem, however, that there will still remain a large group of cases in which no cause for hypertension can be found.

In a study of 212 patients who presented themselves for treatment because of hypertension, Palmer¹¹ found evidence of marked renal disease (asymptomatic) in 47 as a result of routine intravenous pyelograms. In 33 cases the disease was unilateral. The affected kidney was removed in 9 of these cases. The blood pressure was favorably affected in 1, and possibly reduced in 2. Palmer expresses the opinion, which is also held by others, that nephrectomy in cases with unilateral renal disease in order to be effective in lowering blood pressure must be done in young patients in whom the renal disease is of very recent origin.

In essential hypertension no renal disease can be demonstrated in the early stages. It is conceivable, however, that some abnormality of the renal circulation, undemonstrable by modern methods of study, may be present. The arterioles may be constricted by some intrinsic or vasomotor mechanism. This might result in elevation of blood pressure, and in turn in generalized arteriolar constriction as a protective mechanism to prevent damage to tissues. Many authorities hold the viewpoint that high blood pressure is caused by a generalized constriction of arterioles due to vascular disease. Under these circumstances, high blood pressure is the compensatory mechanism for assuring adequate tissue nutrition by forcing sufficient blood through the constricted arterioles. All agree that in this condition the peripheral resistance to blood flow is increased.

Whatever may be the true explanation, the purpose of sympathectomy is to eliminate vasoconstriction where it is most likely to affect the general blood-pressure levels. Vasoconstriction in certain portions of the vascular bed has a much

greater effect on the general blood pressure level than it has in others. For instance, peripheral vasoconstriction has little effect on blood-pressure levels as contrasted with splanchnic constriction. What portion of the splanchnic bed is most important is a question, but one may suspect the renal vascular bed to be particularly so.

One knows from experience with peripheral vessels that vascular relaxation with increased blood flow to the part may occur and persist after sympathectomy, whether the vessel be normal or constricted. The latter may be due to intrinsic disease or increased vasomotor activity, or to a combination of both. In experimental hypertension in animals induced by renal ischemia, a chemical factor, renin, elaborated by the kidney appears to cause the hypertension. That this is also true in man is not as yet known. In animals, this chemical factor disappears if the constricting band is removed before irreparable damage has been done to the kidney. How often a corresponding renal ischemia is the cause of continued arterial hypertension in man is unknown. Nor is it certain whether the original vascular constriction is functional and reversible or organic and irreversible, or whether both factors play a part.

The purpose of sympathectomy is to denervate the blood vessels of the splanchnic bed. Included in this are the kidneys and the adrenal glands. It is essential that the latter be denervated because all sympathectomized vessels will constrict in response to increased secretion of adrenaline into the blood stream. In order that the relaxation be as complete as possible, it is therefore necessary to abolish reflex secretion of adrenaline. Furthermore, the action of adrenaline and similar hormones on denervated arterioles is greater after postganglionic section. It appears wise, therefore, to perform a preganglionic type of denervation so far as possible.

Several methods of splanchnic denervation are in use today. A detailed report of the effect of supradiaphragmatic splanchnic resection (Peet) on hypertensive patients has been made by Braden and Kahn.¹² In a careful review of 264 cases followed for six months to five years, they report an operative mortality of 3 per cent and find that 23 per cent of patients have died since operation. In the remaining cases they find significant reduction of blood pressure in 43 per cent. Of those who were incapacitated before operation, 84 per cent were able to return to their former activities. Symptomatic relief was obtained in 87 per cent. Changes in eyegrounds, as well as in cardiac and renal function, are discussed in some detail.

Adson,¹³ in discussing his experience with subdiaphragmatic splanchnic resection, stresses the importance of the selection of cases. He believes

that the response to sedation and to stimulation by the cold pressor test are valuable guides. In an unselected group of 156 cases, there was 1 operative death. Normal blood pressures resulted in 20 per cent of cases, and significant lowering in 35 per cent. Symptomatic relief in these two groups ranged between 85 and 95 per cent. No effect on blood pressure was noted in 20 per cent, and temporary lowering (six months to two and a half years) was noted in 25 per cent. Adson believes that better results will be obtained in carefully selected cases.

Davis and Barker¹⁴ found that 4 patients who were resistant to sulfocyanate therapy before operation responded favorably to this drug after bilateral supradiaphragmatic splanchnic resection had failed to influence the blood pressure levels. In dogs made hypertensive by renal ischemia (Goldblatt), the blood pressure fell in every case in response to sulfocyanate. This was accompanied by a fall in hematocrit, total protein, urea nitrogen and cholesterol similar to that seen in man. These authors are as yet unable to state whether the response to sulfocyanate in Goldblatt dogs which have also had bilateral supradiaphragmatic splanchnic resection is more marked than in unsympathetized dogs. They have not found a Goldblatt dog that was resistant to sulfocyanate.

My own experience with supradiaphragmatic and infradiaphragmatic resection is similar to that reported by Peet and Adson. I have noted however, that in favorable cases in the same stage of the disease the effect of operation on blood pressure is not always uniform. In fact, there may occasionally be no demonstrable change in blood pressure after operation in patients who do not have sufficient organic vascular disease to account for such a result. It appeared reasonable to suspect that this might be due to incomplete splanchnic denervation because of anatomic variations. For several years I have been varying my operative technique so as to find the minimal procedure that would give good evidence of having resulted in adequate splanchnic denervation. The production of a postural fall in blood pressure has been used as an index of the completeness of interruption of sympathetic pathways. It appears that in order to produce this change in every case, the entire great splanchnic nerve must be removed with its branches to the aorta above the diaphragm and the sympathetic trunk must be removed from above the ninth dorsal to below the first lumbar segment. This requires exposure both above and below the diaphragm which is obtained by resecting the twelfth rib. It enables one to inspect the kidneys and adrenal glands as well. The early effect of this procedure in a small group of cases

operated on during the past year has recently been reported.¹⁵

It would appear that adequate splanchnic denervation in selected cases will result in material and persistent lowering of the blood pressure levels. The true value of sympathectomy as a form of treatment of essential hypertension in man will not be known for several years.

BLADDER PAIN

The relative importance of afferent sympathetic, somatic and parasympathetic pathways from the bladder has been discussed in some detail by Schroeder¹⁶ and Nesbit and McLellan.¹⁷ Both find that resection of the presacral nerve may be very helpful in alleviating the discomfort associated with tuberculosis and interstitial cystitis. The former believes that extirpation of the lateral sympathetic chains as well gives even greater relief, but that intraspinal alcohol injection also may occasionally be necessary. Nesbit and McLellan, on the other hand, find presacral neurectomy alone as effective as if combined with removal of the lateral sacral sympathetic chains. They further believe that few if any pain pathways are interrupted, but that the relief of pain is due to relaxation of the internal sphincter, with elimination of the intense spasm of this muscle which is associated with micturition. In other words, they believe that relief is due to interruption of motor rather than sensory pathways.

ANGINA PECTORIS

The problem of intractable angina and what can be done to relieve it is still under discussion. There are three approaches to be considered: interruption of sympathetic sensory and motor nerves to the heart, lowering of the metabolic needs by total thyroidectomy and increase of the collateral circulation of the heart. The cardiac nerve supply may be interrupted either by actual division or by paravertebral alcohol injection of the nerves concerned.¹⁸ While the former would give a higher percentage of excellent results in those who survived, one must be willing to accept an operative mortality of at least 15 per cent and perhaps higher. Paravertebral alcohol injection results in relief in about 80 per cent of cases, with a mortality of between 1 and 2 per cent. It has therefore taken the place of more risky operative intervention. Raney¹⁹ has recently advocated division of the communicating rami of the second to the fifth dorsal segments, inclusive. He reports a small series of cases with excellent results and without mortality. Exactly the same pathways are interrupted by alcohol injection, and the lat

ter will always carry a much lower mortality. The fact that Raney attributes the benefit to section of motor rather than sensory pathways is more of academic than of practical significance. Moreover, ramisection has never been found to stand the test of time, because of regeneration of interrupted pathways. Alcohol injection lasts as a rule for several years, and can be repeated. Reoperation is not practical. Besides relief of pain, alcohol injection may also result in increased cardiac reserve.

Total thyroidectomy²⁰ is to be considered in a small group of carefully selected cases. It does not have the universal applicability of alcohol injection. The mortality, however, is low (about 4 per cent). The procedure has untoward side effects, myxedema in particular. It does not increase blood flow to the heart, but decreases the demands on the cardiac circulation.

Attempts to increase the collateral circulation of the heart in order to relieve angina may be viewed with interest. By this method, it would appear that if successful one has a chance of prolonging life expectancy. However, the operations (Beck,²¹ Davies, Mansell and O'Shaughnessy²²) are of great magnitude, and carry a high mortality. Those who survive appear to obtain decided benefit. Sufficient time to evaluate this procedure has not elapsed.

At present, it appears that paravertebral alcohol injection is the treatment of choice, and most surgeons would select this method for themselves.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTHEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26131

PRESENTATION OF CASE

A thirty-four-year-old man was admitted to the hospital complaining of hematuria.

The patient was apparently well until the morning of the second day before admission when he suddenly developed a crampy, moderately severe, non-radiating pain in the right lower quadrant of the abdomen. The pain persisted for five minutes, passed away and recurred in the afternoon, although at this time it was less severe. It disappeared after a heavy evening meal, and because of this, the patient thought that the discomfort was a "hunger pain." He was awakened from a sound sleep by another episode of the right lower quadrant pain, but it lasted only a few minutes, vanishing after drinking water. He returned to sleep, awoke at his usual hour, and passed urine intimately mixed with bright red blood. A second specimen passed a few hours later was also bloody. He then came to the hospital and was admitted. The family, marital and past histories were non-contributory.

Physical examination revealed a well-developed and well-nourished, moderately pale man in no apparent discomfort. There was "moderate tenderness along the course of the right ureter and in the right lower quadrant with voluntary spasm." The remainder of the examination was negative.

The temperature, pulse, respirations and blood pressure were normal.

Examination of the blood showed a red-cell count of 5,110,000 with 90 per cent hemoglobin. The urine was bloody and acid in reaction with a specific gravity of 1.014 and a ++++ albumin test; the smear showed no organisms but many red blood cells.

At cystoscopy, the instrument passed easily. The bladder was evacuated of a moderate amount of bloody urine. The bladder mucosa was normally pale. No stones, tumors, ulcers, diverticula or other abnormalities were noted. The ureteral orifices were normal. Clear urine was seen to spurt from the left ureter, bloody urine from the right. The right ureter was easily catheterized.

A flat plate of the abdomen was negative except for slight scoliosis of the lumbar spine toward the right. No stones were seen. By intravenous pyel-

ograms the dye was excreted promptly from both kidneys, outlining normal pelvis and calyces on the left. On the right side the calyces were normal in appearance, but the pelvis was slightly larger than the one on the left; there was no appreciable dilatation, however. Retrograde pyelographic filling showed non-dilated kidney pelvis on the right, the two uppermost calyces showed unusually large pyramids, and there was slight fuzziness of the uppermost calyx.

He continued to pass bloody urine. On the day after admission an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. SALVESTER B. KELLEY: The urologist takes blood cells in the urine very seriously. It has been my suspicion that my medical conferees consider microscopic blood in the urine somewhat lightly, assuming that a man may have inflammation of the urinary tract or a mild nephritis. But urologists believe that hematuria is still the best indication of tumor along the urinary tract, of stone, of tuberculosis or of an inflammatory reaction in the bladder or prostate. This man apparently had been well until two days before admission. The sudden disappearance of pain is unusual in a case with a stone in the urinary tract. The fact that the pain passed away suggests it may have been due to a blood clot that caused temporary obstruction as it was descending through the narrow portions of the ureter. I cannot account for the disappearance of pain after the heavy evening meal. It seems to me a coincidence rather than a factor of any significance in his discomfort.

"He was awakened from a sound sleep by another episode of right lower-quadrant pain. That suggests another clot from the kidney during the night. When he awoke he passed urine intimately mixed with bright red blood. I think the word 'intimately' is an excellent description. It helps the urologist a great deal to know whether the blood is mixed with the whole quantity of urine or whether the bleeding is initial or terminal. Initial hematuria frequently is associated with inflammatory conditions of the prostate. But with clear urine at the beginning of micturition, and a few drops of blood at the end of the stream, we think of a pathologic lesion in the bladder—an acute inflammatory reaction or papilloma. As the bladder contracts it squeezes the lesion and causes it to bleed."

It is of some significance that the family and past histories were negative. When I have a patient with hematuria and pain in the side I go into the history in detail. Very frequently, for example, I find in patients with urinary calculi that

there has been an excessive ingestion of food containing large amounts of calcium, such as milk and cheese. Most recently I have seen a girl who took on her own responsibility a large amount of calcium for some dermatologic condition, and who subsequently developed a stone in the kidney.

The physical examination is helpful in that it reveals a well-developed individual in no apparent distress. The development suggests that he had no tuberculosis. The patient with hematuria frequently looks rather washed out. One often thinks of kidney tumor as presenting the symptoms of pain, a mass in the upper quadrant and hematuria, it should be pointed out, however, that pain is a relatively late manifestation, being the result of necrosis or infection. I am a little skeptical of the observation that the pain followed the course of the ureter. Many attacks of renal colic are associated with pain, localized in the right lower quadrant at a spot which Dr J D Barney once described. If one draws a line between the anterior superior spine of the ilium to the umbilicus, bisects it and then goes downward at a right angle for 25 cm one comes to Barney's point.

The blood pressure was normal, and this, taken with the rest of the picture, makes us fairly sure there was no medical cause for the hematuria, such as nephritis. The red-blood-cell count was normal. I think the ++++ albumin test is a little misleading and undoubtedly due to the large amount of blood in the urine.

Cystoscopy revealed very little. It is quite significant, however, that clear urine was seen to spurt from the left and blood from the right ureter. That is the great advantage of doing a cystoscopy at the time of bleeding. Catheterization is of some significance. While it sometimes is possible to slip a catheter past a ureteral stone, the latter usually obstructs the passage of an instrument from below.

The fact that no stone was seen in the plain x-ray film helps a little. In such a plate one frequently overlooks calculi which are composed of uric acid or which lie in front of the pelvis or spine, therefore a flat plate is not necessarily conclusive. The intravenous pyelogram indicated good function on the right side, but a slightly dilated pelvis. I should attribute this dilatation to blood clot in the kidney pelvis.

I attach great importance to the fact that there was slight fuzziness in the upper calyx. That suggests a tumor growing from the calyx down toward the pelvis. If it had been due to tuberculosis one would not find fuzziness but probably a dilatation of the calyx.

The man continued to pass blood, and an oper-

ation was performed. He was rather young for a renal tumor to occur, the majority of them coming between forty and fifty. There is no evidence of tuberculosis either in the history or physical findings, and I do not believe there was a stone because there was no evidence of obstruction of the ureter and subsequent dilatation. There is no evidence of nephritis from the x-ray description. I should say that this man had a carcinoma originating in the upper calyces of the kidney.

Dr Holmes may offer some suggestion.

DR GEORGE W HOLMES. I hope I may help you a little. Here is the defect described, if one may call it defect. Apparently the upper calyx is one of these bifid affairs with a long narrow infundibulum. The portion connecting it with the pelvis is definitely narrowed and constricted. Usually we should expect another calyx in this region, but there is no indication of it here, not even irregularity in outline. I am not justified in saying that there is a blocked-off calyx. It might be an anatomic variation. The ureter is well filled, with no sign of dilatation or obstruction. In the plain film there is nothing to suggest stone, and the kidneys are normal in size. I should like to take issue with Dr Kelley on his statement about stones. It is true that radiologists overlook them, but their shadows are usually in the films and can be seen if looked for carefully. Dr H O Petersen reviewed 100 cases from the hospital not long ago. While it is true that negative reports were made where stones were present in a considerable number of cases, on re-examination, knowing that there were stones, he was able to find them in all but 2 cases.

Dr Kelley. I stand corrected.

Dr TRACY B MALLORY. Dr Smith, you might tell us your impressions and findings.

DR GEORGE G SMITH. I operated on this man because I believed that the definite scallop in the outline of the upper border of the pelvis was significant of a pressure defect, and because of the apparent slight dilatation and a filling defect in the upper calyx, together with a hematuria. I was not at all sure that he had a tumor of the kidney but believed that there was a strong probability and that it would be much better to explore him and, if I found an early tumor, take the kidney out, than it would be to wait until the diagnosis was absolutely certain. So I operated on him with a diagnosis of probable tumor of the kidney.

At operation a fairly normal looking kidney came into view except that on the anterior surface there was a cyst which extended from the hilus to the periphery. It was about 25 cm wide and apparently occupied the entire parenchyma on that side. I was uncertain for the moment whether that explained the whole thing and whether it

would be better to leave the kidney in, but on palpating the kidney carefully I felt a very hard area buried in the parenchyma just above the hilus and just below the cyst. That was difficult to explain, but it was suggestive enough of tumor so that I removed the kidney.

CLINICAL DIAGNOSIS

Right renal calculus?
Renal cyst?
Renal tumor?

DR. KELLEY'S DIAGNOSIS

Papilloma of right kidney pelvis.

ANATOMICAL DIAGNOSIS

Tuberculosis of kidney

PATHOLOGICAL DISCUSSION

DR. MALLORY The kidney presented a rather unusual appearance. When it was sectioned we found two spherical, slightly white nodules that seemed rather fibrous in character, neither of them particularly suggestive of tumor, nor did either of them show obvious caseation. With a little more exploration a third nodule was discovered at the upper pole of the kidney, and this was frankly caseous in the center. On microscopical examination all three nodules proved to be tuberculous, and there was slight tuberculous erosion of the tips of a couple of pyramids, but the major lesion consisted of these three circumscribed solitary tubercles, which grossly had the appearance of tumor.

DR. HOLMES It is not surprising under the circumstances that the pyelogram was very misleading. I cannot remember ever having seen renal tuberculosis in this region.

CASE 26132

PRESENTATION OF CASE

A fifty-year-old Russian housewife was admitted complaining of abdominal pain.

One week before entry, following a banquet, the patient experienced a sensation of mid-epigastric fullness, which radiated around both costal margins to the back. Removal of her corset afforded considerable relief and, except for malaise, the patient felt well during the next two days. Four days prior to admission she was awakened in the morning with dull aching pain along the lower rib margins on both sides, radiating to the right shoulder blade. She was unable to put on her corset because of tenderness in the right upper abdomen. The tenderness became exquisite, and two days before coming to the hospital the patient noted a lump in the right upper quadrant.

There was no nausea, vomiting or colicky pain. Bowel movements, which had always occurred regularly daily, became costive during the week of illness. The upper abdominal pain persisted until entry.

The past history was noncontributory.

Physical examination showed a well-developed and nourished woman lying comfortably in bed. The lungs were clear. The heart was not enlarged, but a soft blowing systolic murmur was heard in the third left interspace. The blood pressure was 175 systolic, 100 diastolic. The abdomen was soft, but there was slight tenderness in the right upper quadrant. A smooth mass, evidently liver, with a sharp edge, extended four fingerbreadths beneath the costal margin from the epigastrium laterally into the right flank. Attached to it in the midclavicular line was a prominent, firm, walnut-sized knob. The remainder of the examination was negative.

The temperature, pulse and respirations were normal.

Examination of the urine showed a specific gravity of 1.030, with a slight trace of albumin, a green precipitate was produced by Benedict's test, and the sediment was negative. The blood showed a hemoglobin of 90 per cent and a white-cell count of 10,150. The nonprotein nitrogen of the blood was 26 mg per 100 cc. The blood sugar was 246 mg per 100 cc, and the carbon-dioxide combining power 55.3 vol. per cent.

A plain x-ray film of the abdomen showed an ovoid mass of calcification just above the hepatic flexure of the colon. The mass measured 5 by 3.5 cm and was not homogeneous, the denser portion being in its center. A Graham test showed no filling of the gall bladder. With the patient standing, the area of calcification changed its shape and exhibited a definite fluid level, 4.5 cm in width, the denser portion of the shadow was there in the lower part of the mass.

Two days after entry a laparotomy was performed.

DIFFERENTIAL DIAGNOSIS

DR. RICHARD H. WALLACE This fifty-year-old housewife had been quite well until one week before admission, when she had mid-epigastric fullness which radiated around both costal margins to the back. This episode suggests the onset of gallstone symptoms, without, on this first attack, residual symptoms to indicate complicating inflammation. However, recurrence of pain in this region, radiating to the back with increasing severity and persistence of tenderness and pain for four days are strongly suggestive of obstruction of the cystic duct and inflammation of the gall bladder. We must, however, consider subacute perforation of a peptic ulcer and perihepatitis. Cirrhosis is

possible, but congested liver unlikely without other positive findings of heart failure

Incidentally, mistaking perihepatitis for acute cholecystitis is a fairly common error, but usually occurs in cases in which there is more tenderness and spasm and the gall bladder is not felt. In this case the palpation of a mass below the liver edge is good confirmatory evidence of cholecystitis.

The blood sugar is not reported as a fasting specimen but even so the patient must have been diabetic. Since the pancreas is under suspicion we should mention pancreatic duct stone and pancreatitis, but there is no record of tenderness posteriorly to support either diagnosis. I do not believe diabetes plays an important part in her illness, but gallstones and acute cholecystitis are commoner in diabetics than in non-diabetics. The normal temperature and pulse and the white count of 10,000 with a four-day story probably mean that the gall bladder was not really acutely inflamed, but they are quite consistent with cystic duct blockage and a tense edematous gall bladder. However it is frequently difficult to correlate the acute or subacute gall bladder found at operation with the history, physical examination and laboratory data. There is no mention of jaundice, and the single attack of persistent pain rather than repeated attacks of colic is against the likelihood of finding a stone of the common duct. In a recent review¹ of the cases of common-duct stone in this hospital, 37 per cent of them were found in the absence of jaundice. In this group the most reliable point in the history was colicky pain recurring every week or at more frequent intervals.

The x-ray films showed a mass of calcification in the right upper quadrant. Presumably there had been no previous examination with barium or other opaque media. A calcified mass in this region might be a calcified hematoma, lymph node, echinococcus cyst or even tumor, and of course might be a gallstone or a kidney stone. I believe we can rule out all these possibilities, however, as they are all solid masses, whereas the films showed change in shape and a fluid level with change of position. The Graham test showed no filling of the gall bladder, and I assume it did not empty with a fatty meal. In addition the denser portion of the shadow shifted to the lower part of the mass. This must mean fluid rich in calcium or other radio-opaque material confined to a sac. I know of only one condition which gives this picture, and this is rarely recognized preoperatively.

The two most recent articles I can find are in the German literature^{2,3}

This case, I believe, had all the essentials of the disease. The first essential is cystic-duct obstruction,

which probably has been present long before the initial symptoms as it is a gradual process. Pain then occurs with the distention of the gall bladder. Finally comes the palpable gall bladder, which is not really tender since acute inflammation is not a part of the picture. The x-ray findings are characteristic, and the important points are just as described—a calcified mass, as seen in a plain film, which, with change of the patient's position, has a change of shape and a definite fluid level with the denser portion of the shadow in the lower part of the mass. If cholesterol or cholesterol calcium stones are present, they float on top of the heavy fluid which is chiefly 85 to 95 per cent calcium carbonate and is called "chalk bile" or "lime-water bile."

The unopened organ should have the appearance of a hydrops of the gall bladder with cystic duct obstruction, and I believe the opened specimen should show no bile but a white liquid composed chiefly of salts of calcium.

PREOPERATIVE DIAGNOSES

Cystic duct stone

Hydrops of gall bladder ("milk-of-calcium bile")

DR WALLACE'S DIAGNOSIS

"Chalk bile" gall bladder

ANATOMICAL DIAGNOSES

Chronic cholecystitis

Cholelithiasis

Hydrops of gall bladder (calcium-milk bile)

PATHOLOGICAL DISCUSSION

DR TRACY B. MALLORY: The distinctly unusual x-ray findings in this case permit, if one knows how to interpret them, a diagnosis of exceptional accuracy, which Dr Wallace has just made. The patient was operated on by Dr Edward L. Young, who found a slightly dilated, thickened gall bladder, which was completely obstructed by two stones in the cystic duct. It was removed without difficulty, and the common duct was explored and found to be negative. On opening the gall bladder a hydrops was found. There was about 50 cc. of colorless fluid which contained a thick sediment of white chalky material. A single small calcium stone 5 mm in diameter was found, and the remaining particles were of microscopic size. The wall of the gall bladder showed definite fibrous thickening and a slight inflammatory reaction.

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1. Allen A. W. and Wallace R. H. Surgical management of stone in the common duct. *Am J Surg* (in press).
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DIRECTORY OF MEDICAL SPECIALISTS

With the publication of the *Directory of Medical Specialists** there is now available a list of certain practitioners of medicine and surgery who have been judged by their elected representatives to be worthy of isolation from the general mass of their co-practitioners. They have demonstrated to the satisfaction of various examining boards that they have more than usual ability, or if one prefers, a minimal acceptable ability, to practice their chosen specialty and have agreed to limit their practice to that particular field. Such a procedure and such a segregation cannot be commended too highly. It is in line with the other great steps that have been taken in the past by the medical profession for the protection of the public, and particularly supplements the now general recognition of the fact

that hospitals are the best places for sick people, and the increasingly common requirement that hospitals have some sort of closed staff control.

A brief study of the life history of these two latter reforms in medical practice demonstrates at once, however, that neither reached its greatest usefulness until after the public—that is the patients—had been educated. Time and experience had to accumulate before the education took effect. So today, before the full public worth of this latest reform movement within the medical ranks can be attained, time and experience must again accumulate and the public must again be educated up to the point of acceptance.

The truism that anything that is worth doing at all is worth doing well should nevertheless be taken to heart by all originators of reform or educational movements. In particular this applies to the examinations given by the various American boards and to the educational requirements that must precede such examination. Reports of the examinations have already led to ridicule of their content and suggest that the examiners have on occasions been more interested in limiting the number of certificate holders than in determining the fitness of the individual candidate. This ridicule is quite intangible and is always denied, but nevertheless exists and is harmful. It is doubly harmful because it is unnecessary. This movement is too valuable to be spoiled by the thoughtlessness and narrow mindedness of a few examiners, and more care should be taken to see that examinations demonstrate the candidates' fitness to practice rather than the examiners' special knowledge.

In reference to the other criticism noted above, it should be evident and emphasized that any movement looking toward better medicine and surgery for the public must be applicable to the profession as a whole and not to only a chosen few if there is to be any general support for the movement. Pre-examination requirements, for example, that deny certificates as surgeons to all medical school graduates until after they have spent five to seven additional years in a hospital will go far to defeat their own end. While it is

Directory of Medical Specialists: 1939. Edited by F. I. Titus. 1573 pp. New York: Columbia University Press, 1940.

possible, but congested liver unlikely without other positive findings of heart failure

Incidentally, mistaking perihepatitis for acute cholecystitis is a fairly common error, but usually occurs in cases in which there is more tenderness and spasm and the gall bladder is not felt. In this case the palpation of a mass below the liver edge is good confirmatory evidence of cholecystitis.

The blood sugar is not reported as a fasting specimen but even so the patient must have been diabetic. Since the pancreas is under suspicion we should mention pancreatic duct stone and pancreatitis, but there is no record of tenderness posteriorly to support either diagnosis. I do not believe diabetes plays an important part in her illness, but gallstones and acute cholecystitis are commoner in diabetics than in non-diabetics. The normal temperature and pulse and the white count of 10,000 with a four-day story probably mean that the gall bladder was not really acutely inflamed, but they are quite consistent with cystic duct blockage and a tense edematous gall bladder. However it is frequently difficult to correlate the acute or subacute gall bladder found at operation with the history, physical examination and laboratory data. There is no mention of jaundice, and the single attack of persistent pain rather than repeated attacks of colic is against the likelihood of finding a stone of the common duct. In a recent review¹ of the cases of common-duct stone in this hospital, 37 per cent of them were found in the absence of jaundice. In this group the most reliable point in the history was colicky pain recurring every week or at more frequent intervals.

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MASSACHUSETTS MEDICAL SOCIETY

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AND GYNECOLOGY*

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Boston

SEPSIS FOLLOWING CESAREAN SECTION

Mrs. M. Z., a twenty-two-year-old primipara was admitted to the hospital October 29, 1933, three hours after the onset of labor. A vaginal examination had been performed at home, at which time the doctor found a floating head.

The patient's health had always been good. She gave no history of system diseases or of serious contagious diseases. There had been no operations in the past. Catamenia had always been irregular occurring every twenty-five or thirty-two days, and were scant in amount of flow. The last menstruation began January 18, the expected date of confinement being October 25.

On entry to the hospital the patient had labor pains coming at five minute intervals. The general physical examination was negative. The heart was not enlarged, there were no murmurs. The pulse rate was 106. The blood pressure was 142 systolic, 82 diastolic. Abdominal examination revealed uterine contractions of moderate severity which lasted forty seconds. There seemed to be a full-term normal pregnancy. The head was overriding the symphysis to a moderate degree, the position was LOP. The fetal heart was regular in action, the rate was 140. The pelvic measurements were as follows: I.C. 28 cm, I.S. 25.5 cm, E.C. 19.5 cm, I.T. 9.5 cm. Rectal examination revealed the cervix to be dilated so as to admit three fingers. The amniotic sac bulged through the external os. The cervix was completely effaced.

The patient was given Nembutal and scopolamine and allowed to proceed in labor. Five hours after entry and eight hours after the onset of labor vaginal examination with aseptic technique disclosed the cervix to be fully dilated, the head to be high and the true conjugate to be 8 cm. An immediate operation was performed under nitrous oxide, oxygen and ether anesthesia. The baby was delivered through a Kerr incision, and weighed 5 pounds, 14 ounces, it was in good condition and was easily resuscitated. The uterine cavity contained yellowish-green material with a very foul odor. A culture was not taken at that time.

A few hours after the operation the patient had a temperature of 102.8°F and was given a clysis

The day following operation she passed a foul smelling yellowish clot, which looked like infected secundines. She was therefore given ergot and was placed in the high Fowler position.

During the first five days after operation the temperature ranged from 100 to 102°F and the pulse fluctuated between 100 and 120. On the seventh postpartum day the temperature went to 105°F rectally, and the pulse rate to 140. A transfusion of 350 cc of citrated blood was given. An other transfusion was given on the tenth day. The abdominal wound drained purulent material, and finally completely broke down so that the uterus could be visualized in the bottom of the septic wound. A culture taken from the wound showed streptococci, staphylococci and colon bacilli. Due to the marked peritonitis from which the patient was suffering she was Ochsnerized. Daily hypodermoclyses and injections of intravenous glucose solution were given. Transfusions were repeated every three or four days.

Two weeks after operation the patient's chest revealed bilateral bronchopneumonia by physical examination, a finding which was corroborated by x-ray. This subsequently subsided.

Abscess cavities eventually developed in both flanks of the abdomen. The one on the left was incised by means of a stab wound just below the costal margin. The abscess in the right lower abdominal quadrant was broken into through the abdominal incision. The wound eventually became free of infection and granulated in under treatment with Dakin's solution.

Two months following the cesarean operation and after two weeks of normal temperature the abdominal wound was repaired by a secondary closure. Parallel incisions were made in the rectus sheaths 1 cm. from the edge of the defect. The inner edges of the incisions were turned toward the midline and were approximated by catgut sutures. The outer cut edges were then sutured together, a procedure which gave two layers of fascia over the granulating area. There was considerable tension, but the wound healed solidly and the patient was discharged approximately three months after entry.

On December 27, 1937, the patient was admitted to the hospital for another cesarean section. The abdominal wound had remained intact throughout this pregnancy. At operation there were no adhesions in the peritoneal cavity. The classical incision was used. The patient had an afebrile convalescence and was discharged in good condition on the seventeenth postpartum day.

Comment. This case of uterine sepsis and peritonitis followed cesarean section. It is unfair to attribute the infection to the test of labor which

* A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

this patient was given inasmuch as it lasted only eight hours and inasmuch as the membranes had not ruptured. It is barely possible that the infection was introduced by the examination performed before the patient reached the hospital. The low cervical operation did not prevent infection. There is no evidence in the record that a temperature existed before delivery, although a temperature of 102.8°F was noted a few hours afterward. It would have been interesting to have had a culture from the yellowish-green material with a very foul odor which was found in the uterus at the time of operation. Had this culture been positive, one would then have known that an infection was present before delivery. The low-grade temperature reported for the first five days after operation leads one to infer that the infection was at that time solely uterine. The temperature rise to 105°F on the seventh postoperative day suggests either that an abscess was forming in the uterus or that there was an extension into the peritoneal cavity. Sulfanilamide might have shortened very materially the convalescence. The secondary operation two months later for the closure of the abdominal wound was successful, as proved by the scar remaining well healed without hernia during the subsequent pregnancy.

It is doubtful under the circumstances whether anyone would have been justified in doing any form of extraperitoneal operation on this case as the record reveals no definite evidence that the operation was being performed on an already infected uterus. In cases where the test of labor has been prolonged beyond twelve hours, particularly with ruptured membranes, some form of extraperitoneal operation is probably the conservative procedure. This case illustrates again the value of repeated small transfusions in septic cases of long duration.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning March 31

BERKSHIRE

Thursday, April 4, at 4 30 p.m., at the Bishop House of Mercy Hospital, Pittsfield. Gonorrhea in the Female. Instructor Sylvester B. Kelley. Harry G. Mellen, *Chairman*.

BRISTOL SOUTH (Fall River Section)

Tuesday, April 2, at 4 30 p.m., at the Union Hospital, Fall River. Pneumonia. Instructor Charles A. Janeway. Howard P. Sawyer, *Chairman*.

FRANKLIN

Thursday, April 4, at 8 15 p.m., at the Franklin County Hospital, Greenfield. Common Problems

of Neurology. Indications for lumbar puncture. Instructor H. Houston Merritt. Halbert G. Stearson, *Chairman*.

HAMPDEN

Thursday, April 4, at 4 00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 15 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Head and Spine Injuries. Instructor Walter R. Wegner. George L. Schadt, *Chairman*.

HAMPSHIRE

Thursday, April 4, at 4 15 p.m., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton. Indications for Cesarean Section. Instructor Judson A. Smith. Warren P. Cordes, *Chairman*.

MIDDLESEX SOUTH

Tuesday, April 2, at 4 30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. The Use of Biological Preparations in Pediatric Practice. Instructor Richard M. Smith. Dudley Merrill, *Chairman*.

NORFOLK

Thursday, April 4, at 8 30 p.m., at the Norwood Hospital, Norwood. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor Marshall N. Fulton. Hugo B. C. Riemer, *Chairman*.

NORFOLK SOUTH

Monday, April 1, at 8 30 p.m., at the Quincy City Hospital, Quincy. Head and Spine Injuries. Instructor Walter R. Wegner. David L. Belding, *Chairman*.

PLYMOUTH

Tuesday, April 2, at 4 00 p.m., in the Nurses' Home of the Brockton Hospital, Brockton. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor James M. Faulkner. Walter H. Pulsifer, *Chairman*.

SUFFOLK

Thursday, April 4, at 4 30 p.m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. Syphilis in Pregnancy and the Offspring. Instructor C. Guy Lane. Reginald Fitz, *Chairman*.

DEATHS

GALLAGHER—JOHN H. C. GALLAGHER, MD, of Chicopee, died March 19 at St. Petersburg, Florida. He was in his sixtieth year.

He was born in Leominster and attended the University of Maryland, receiving his degree from Baltimore Medical College in 1903. Before starting practice in Chicopee he spent a year at the Providence Hospital in Holyoke. During the summer of 1907 he studied at the University of London and also at Vienna. In 1910 he received the appointment as medical examiner of the Fifth Hampden District. Dr. Gallagher also studied at the Massachusetts Eye and Ear Infirmary, and was former school physician in Chicopee. He was a past president on the staff of the

Mercy Hospital and had retired from active practice in 1935.

Among his affiliations were fellowships in the Massachusetts Medical Society and the American Medical Association and memberships in the American Academy of Ophthalmology and Oto-Laryngology and the New England Otolaryngological and Laryngological Society.

His widow two sons, his mother, three sisters and three brothers survive him.

LA MOUREAU.—JOSEPH E. LA MOUREAU M.D. of Lowell, died March 16. He was in his seventy-second year.

Born at Chambly, Quebec, he received his education at the College of St. Charles Borromeo in Sherbrooke. He received his degree from the University of Montreal Faculty of Medicine in 1893. Dr. Lamoureux started practice in Lowell immediately after his graduation. For nine years he was a member of the Public Health Council of Massachusetts and a member and president of the former Lowell Corporation Hospital staff. He was the first president of the staff of St. Joseph's Hospital in Lowell. Dr. Lamoureux was a member of the Massachusetts Medical Society and of the American Medical Association.

His widow two sons, two daughters and seven grandchildren survive him.

MIDDLETON.—WILLIS J. MIDDLETON M.D. of East Acton, died March 14. He was in his seventy-third year. Born in Boston he received his degree from Tufts College Medical School in 1901. Dr. Middleton taught anatomy at Tufts College Medical School for five years. A specialist in obstetrics, he taught that subject at the Quincy City Hospital, where he was a staff member for many years. Dr. Middleton was a former member of the Massachusetts Medical Society.

A son, a daughter and six grandchildren survive him.

GREEN LIGHTS TO HEALTH

APRIL—MAY—JUNE

SPONSORED BY THE MASSACHUSETTS MEDICAL SOCIETY AND THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

COURTNEY WAAB—TUESDAYS, 9:45 A.M.

April 2. So You Are Going to the Hospital! John P. Monks.

April 9. Choosing a Camp for Your Child. Warren R. Sisson.

April 16. Hay Fever. I. Chandler Walker.

April 23. What a Health Examination Means. Michael E. Murray.

April 30. Protecting the Teeth of the Child. Paul K. Losch.

May 7. Headache. H. Houston Merritt.

May 14. Alcoholism. Merrill Moore.

May 21. From What Diseases Should Children Be Protected? Edwin H. Place.

May 28. When to Call the Doctor. James M. Faulkner.

June 4. Sulfanilamide: Medicine's new lifesaving drug. Charles A. Janeway.

June 11. Are Vacations Necessary? Alfred Kravetz.

June 18. Why Doesn't Tuberculosis Disappear? Henry D. Chadwick.

June 25. Important Facts about the Fourth. Robert H. Aldrich.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS JANUARY 1940

| DISEASES | JANUARY 1940 | JANUARY 1939 | 5 YEAR AVERAGE |
|---------------------------|--------------|--------------|----------------|
| Anterior poliomyelitis | | 0 | 0 |
| Chicken pox | 2328 | 1433 | 1839 |
| Diphtheria | 35 | 21 | 39 |
| Dog bite | 602 | 509 | 550 |
| Dysentery bacillary | 34 | 70 | 6 |
| German measles | 36 | 67 | 251 |
| Gonorrhea | 342 | 380 | 460 |
| Lobar pneumonia | 620 | 618 | 749 |
| Measles | 961 | 1985 | 1890 |
| Meningococcus meningitis | 3 | 6 | 9 |
| Mumps | 562 | 771 | 902 |
| Paratyphoid B fever | 5 | 0 | 0 |
| Scarlet fever | 565 | 793 | 1004 |
| Syphilis | 431 | 400 | 439 |
| Tuberculosis, pulmonary | 196 | 250 | 282 |
| Tuberculosis, other forms | 8 | 20 | 30 |
| Typhoid fever | 8 | 8 | 6 |
| Undulant fever | 2 | 8 | 4 |
| Whooping cough | 625 | 953 | 983 |

Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Boston, 1; Winchester 1 total 2.

Diphtheria was reported from Arlington, 1; Boston 2; Cambridge, 8; Chelsea 2; Danvers, 3; Fall River 5; Lawrence, 8; Methuen 3; North Attleboro, 1; Revere 1; Worcester 1 total 35.

Dysentery bacillary was reported from Beverly 3; Boston, 2; Cambridge, 6; Greenfield, 2; Lynn, 4; Medford, 1; Nauck, 1; Northampton 1; Quincy 1; Reading, 2; Salem 5; Somerville, 1; Sterling 1; Tewksbury 1; Wrentham 1; Worcester 1; Wrentham, 1 total, 34.

Meningococcus meningitis was reported from Boston 1; Medford 1; North Reading, 1 total 3.

Paratyphoid B fever was reported from Boston 1; Holyoke, 1; Lawrence, 1; Newburyport, 1; Pittsfield, 1 total, 5.

Pellagra was reported from Boston 3 total 3.

Septic sore throat was reported from Belmont, 1; Boston, 13; Cambridge, 2; Fall River 1; Lawrence, 1; Merrimac, 1; Northfield, 1; Oxford 2; Plymouth 1; Waltham 1; Winchester 1; Wrentham 1 total 26.

Tetanus was reported from Worcester 1 total, 1.

Trachoma was reported from Boston, 1; Bridgewater 1 total 2.

Trichinosis was reported from Franklin 1 total, 1. Typhoid fever was reported from Boston, 2; Norton, 1; Norwood, 1; Peabody 1; Rockport, 1; Swampscott, 1; Uxbridge, 1 total, 8.

Undulant fever was reported from Freetown 1; Pittsfield 1 total 2.

The incidence of chicken pox was higher than has ever been reported.

Bacillary dysentery primarily of the Sonne type, continued to be prevalent, the level being slightly higher than that of last month.

The level of reported cases of paratyphoid B fever was slightly higher than it has been for the past three months.

There was a continuation of the slight upward trend of diphtheria cases, the incidence being higher than it has been since January 1936.

The reported incidence of measles was well below the five year average.

Scarlet fever had its lowest January incidence since 1919. German measles, meningococcus meningitis, pulmonary tuberculosis and whooping cough were all reported below the five year average.

There was nothing remarkable in the reported incidences of anterior poliomyelitis, gonorrhea, syphilis, lobar pneumonia and mumps

Typhoid fever and undulant fever were reported at expected levels

REPORT OF MEETING

NEW ENGLAND ROENTGEN RAY SOCIETY

A meeting of the New England Roentgen Ray Society was held at the Beth Israel Hospital on December 15, 1939, with Dr Samuel A. Robins presiding

The first speaker was Dr Monroe J Schlesinger, whose subject was "The Roentgenological Visualization of the Coronary Arteries." Attempts to study the configuration of these vessels post mortem were initiated in 1896 and perfected by Gross in 1921. Dr Schlesinger, however, essayed to dissect the heart to duplicate the diaphragms of Spalteholz, so that the coronary arteries might be visualized in one plane. The speaker described his two-colored injection mass and the manner of such dissection of the unfixed heart. Although of the 300 organs thus treated no two showed similar arterial patterns, one was able to place them in three general categories. The first group, which contained 50 per cent of the specimens, had a predominance of the right coronary artery, which crossed to the left side as well as to the posterior septum. In such hearts, two thirds of the infarcts were healed. The second group consisted of fairly well balanced right and left coronary systems and accounted for about 35 per cent of the hearts. In this type there were fewer infarcts, and these were always healed at autopsy. The last group showed a left coronary preponderance, which was present in about 15 per cent of the specimens examined. This was by far the poorest kind of circulation, with the patient dying after infarction in all cases. An important finding was the absence of any anastomoses unless there was evidence of past or present coronary narrowing or occlusion. This indicates that increase of collateral vessels is not a normal concomitant of increasing age and that occlusion is necessary for the development of such anastomoses.

The second paper, by Dr Herrman L. Blumgart, was related to the first and was concerned with the clinical implications of these pathological findings. A correlation of the number of occlusions found at autopsy with the clinical history indicated that patients with angina pectoris had, on the whole, about twice as many damaged arteries as did those without. The severity of symptoms, however, was not always a direct corollary of the organic lesions, for cases were cited of those who carried on in an essentially normal manner despite the thrombosis of two or all three coronary arteries.

Dr Charles G. Mixter presented evidence for "The Value of Cholangiography During Operation." The background for the use of this procedure lay in the increase in choledochostomy from about 8 to 40 per cent due to the number of recurrences following simple cholecystectomy. And since 20 to 30 per cent of these explorations are negative and there is a considerable increase of mortality and morbidity attendant on the procedure, it would be exceedingly beneficial if one could obviate the useless exploration and still be certain before completing the operation that there were no further stones present. Before discussing the results of the roentgenological method, however, Dr Mixter asserted that cholangiography should not replace common-duct exploration when there are definite clinical indications for the latter. Three types of cholangiograms were made: a closed one before ex-

ploration, an open one after exploration but while the patient was still on the operating table, and a postoperative one during convalescence. Although the results with the closed method showed promise, the finding of stones in 7 of 18 cases with negative cholangiograms was considered only a fair result. The open cholangiogram, which was 94 per cent correct, was heartily endorsed.

The next paper was that of Dr Karl Presser on "The Early Diagnosis of Prepyloric Carcinoma." The speaker emphasized that the normal rugal pattern and normal peristalsis of the stomach are functional signs dependent on the integrity of the mucosal, submucosal and muscular structures. Normal rugae may thus be lacking in the presence of submucosal lesions with a normal overlying mucosa. Dr Presser suggested the wider use of serial spot film during the entire course of the peristaltic cycle. A comparison of superficial benign lesions and adhesions with the infiltrative lesions of carcinoma was illustrated by film. Although filling defects may be present in either type of lesion, neoplasms show characteristic abnormalities of the peristalsis, which are consistently visible and not changing even when present in early lesions. Any infiltrating disease may give a similar roentgenogram, and syphilis must be ruled out. Benign tumors are best differentiated by the presence of normal peristalsis during the entire cycle and on repeated examinations. Dr Presser showed the films of three cases in which operations had been performed on the strength of x-ray findings consistent with very early prepyloric cancer, the diagnosis were not confirmed until histological examinations were completed. It was stressed that clinically early cancer often show advanced lesions by roentgenograms because of the accuracy of examining the gastrointestinal tract as a functioning organ by the latter method. Thus, the responsibility of the roentgenologist in the early diagnosis of gastric carcinoma and the importance of serial spot film during the peristaltic cycle were brought out by the speaker.

The next paper on "Changes in the Uterus Following Roentgen Therapy, Demonstrated by Uterotubography" was presented by Dr William S. Altman. The study was based on 15 cases of menorrhagia in which the diagnoses were checked by diagnostic dilatation and curettage prior to irradiation. The same changes from muscular to fibrous tissue were observed in the aged and those subjected to roentgen therapy. The effects might be exerted on the uterus either directly or through the deleterious action of irradiation on the ovaries. Uterotubograms, before and after radiation, demonstrated marked shrinkage of the uterus. All patients experienced relief of menorrhagia within one to two months with doses of radiation varying from 800 to 3200 r, with never more than 1600 r being given in any one series. Three patients required operative intervention for symptoms other than menorrhagia. In summary, Dr Altman stated that 1200 r was probably a sufficient dose and that the severity of the ensuing menopause was probably proportional to the amount of treatment given. The effect was best in patients with a hyperplastic type of endometrium, next best in those with subserous fibroids, and next in those with submucosal fibroids.

The final speaker was Dr Harry F. Friedman, whose subject was "Observations on Contact Roentgen Therapy." There was a description of the apparatus employed, which enables the anode to be within 18 mm of the lesion. The importance of the distribution rather than kind of radiation was stressed. Lesions may be naturally or artificially accessible, bladder lesions being in the latter group. The advantages as enumerated by Dr Friedman consisted of

greater intensity with little reaction a high dosage rate, and a low cost and short duration for the treatment. The time employed was from five seconds to six minutes, and this was cited as being particularly desirable in the treatment of oral carcinoma. About 8200 r of unfiltered radiation per minute can be delivered by the machine. One important consideration is the rapid falling off of intensity with depth, so that only 20 per cent is absorbed unfiltered at a distance of 1 cm. Single dosage, figured on that necessary to destroy the tumor with no attention to the skin has superseded fractional irradiation in this type of treatment. The stated prerequisite for contact roentgen therapy was an accessible lesion which was not too thick. The principle of treatment was to deliver a maximal dose to the tumor base without consideration for the skin. He added that poor permeability accounts for the lack of damage to the surrounding normal tissue.

NOTICES

BOSTON GASTROENTEROLOGICAL SOCIETY

The next meeting of the Boston Gastroenterological Society will be held in the Andrew Carney Hospital Assembly Room of the Carney Hospital on Wednesday April 3 at 12 o'clock noon.

PROGRAM

The Treatment of Peptic Ulcer Complicated by Diabetes Mellitus. Dr. C. W. Finnerty
Rectal Polyps. A pathological discussion. Drs. T. F. P. Lyons and M. Vidoli.
Case Discussion. Dr. A. McKay Fraser
Achochylria. Dr. Louis F. Curran.
Physicians, medical students and nurses are invited.

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall 9-10 a.m.

MEDICAL CONFERENCES

Tuesday April 2—Ewing's Sarcoma. Dr. C. P. Roberts.
Thursday April 4—The Use of Staphylococcal Antibiotic in Osteomyelitis with Septicemia. Dr. W. A. MacColl.
Friday April 5—Studies of Radio-Active Iodine in Relation to Thyroid Disease. Dr. Saul Hertz.
Tuesday April 9—Studies on Purpura in Relation to the Spleen and Bone Marrow. Dr. William Dame.
Thursday April 11—Diagnostic Errors. Dr. H. G. Brugsch.
Friday April 12—Prothrombin and Vitamin K. Dr. E. L. Lozner.
Tuesday April 16—The Origin, Diagnosis and Treatment of Pituitary Body Tumors. Dr. Oscar Hirsch.
Thursday April 18—Gastrointestinal Clinic. Drs. K. S. Andrews, H. H. Lerner and L. M. Asher.
Tuesday April 23—Ovarian Tumors. Dr. J. T. Smith.
Thursday April 25—Off the Main Road in Diabetes. Dr. J. J. Schloss.
Friday April 26—Small Bowel Obstruction. Dr. L. S. McKittick.
Tuesday April 30—The Soldier and His Heart. Dr. P. D. White.
Wednesday May 1—Hospital case presentation. Dr. J. E. Paullin.
Thursday May 2—Clinicopathological conference. Dr. C. S. Keefer.
Friday May 3—A Review of Diabetes. Dr. E. P. Joslin.
Saturday May 4—Hospital case presentation. Dr. J. E. Paullin.

On Wednesday and Saturday mornings throughout the month of April Dr. S. J. Thannhauser will give a medical clinic on hospital cases.

For the week April 29 to May 4 Dr. James E. Paullin, professor of medicine at Emory University Atlanta Georgia will act as physician-in-chief pro tem of the Joseph H. Pratt Diagnostic Hospital. He will conduct ward rounds each morning from 8 to 9 o'clock, and give clinics on Wednesday and Saturday mornings, May 1 and 4 from 9 to 10 o'clock.

These clinics are open to the profession and medical students.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society will be held in the auditorium of the Beth Israel Hospital on Tuesday evening April 2, at 8:15.

Dr. Arthur M. Fishberg, associate in medicine, Mt. Sinai Hospital New York City will speak on "Essential Hypertension." A discussion by Dr. Samuel A. Levine, David Davis, David Aymon and Maurice B. Strauss will follow.

WILLIAM HARVEY SOCIETY

The sixth lecture of the season sponsored by the William Harvey Society of the Tufts College Medical School will be given in the auditorium of the Beth Israel Hospital on Friday evening April 5 at 8:00. Dr. Emil Novak, associate professor of obstetrics at the University of Maryland, will speak on "The Endocrine Influence of Certain Ovarian Tumors."

TUFTS MEDICAL ALUMNI LECTURE

The annual alumni lecture will be given at Tufts College Medical School on Wednesday April 3 at 4:00 p.m. Colonel G. R. Callender '08 will speak on "Diarrheal Diseases."

Physicians and students are cordially invited to attend.

CHELSEA NAVAL HOSPITAL

The staff of the Chelsea Naval Hospital will give a clinic for the Colonel Williams Chapter of the Association of Military Surgeons of the United States on Friday evening April 5 at 8:00. The subject will be "Gastrocolic Fistulas." Refreshments will be served following the meeting.

All members of the Association and all members of different branches of the medical services of the United States are invited. Those who expect to attend are requested to notify Major Richard H. Miller, United States Reserve, South Army Boston before March 30.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY MARCH 31

SCHWAB MARCH 31

4 p.m. Eczema I. Babes. Dr. Lewis W. Hill. Illustrated public health lecture. 1700 North Hospital auditorium.

TUESDAY APRIL 2

9-10 a.m. Ewing Sarcoma. Dr. C. P. Roberts. Joseph H. Pratt Diagnostic Hospital.

8:15 p.m. Essential Hypertension. Dr. Arthur M. Fishberg. Greater Boston Medical Society. Beth Israel Hospital auditorium.

WEDNESDAY APRIL 3

9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

12 m. Boston Gastroenterological Society. Carney Hospital.

4 p.m. Diarrheal Diseases. Colonel G. R. Callender. Tufts College Medical School.

THURSDAY APRIL 4

9-10 a.m. The Use of Staphylococcal Antibiotic in Osteomyelitis with Septicemia. Dr. W. A. MacColl. Joseph H. Pratt Diagnostic Hospital.

7 15 p.m. Circulatory Failure Dr Laurence B Ellis New England Hospital for Women and Children

FRIDAY APRIL 5

*9-10 a.m. Studies of Radio-Active Iodine in Relation to Thyroid Disease Dr Saul Hertz Joseph H Pratt Diagnostic Hospital

8 p.m. The Endocrine Influence of Certain Ovarian Tumors Dr Emil Novak William Harvey Society Beth Israel Hospital auditorium

SATURDAY APRIL 6

*9-10 a.m. Hospital case presentation Dr Thannhauser Joseph H Pratt Diagnostic Hospital

Open to the medical profession

MARCH 29 — Luncheon meeting of the clinical staff of the Boston Dispensary Page 514 issue of March 21

MARCH 29 — Staff meeting United States Marine Hospital Page 514 issue of March 21

APRIL 2-MAY 4 — Joseph H Pratt Diagnostic Hospital medical conferences Page 561

APRIL 5 — Chelsea Naval Hospital Page 561

APRIL 11 — Pentucket Association of Physicians 8 30 p.m. Hotel Bartlett Haverhill

APRIL 15-17 — American Association for the Study of Goiter Page 203 issue of February 1

APRIL 15-19 — New England Health Institute Page 284 issue of February 15

APRIL 24 — Massachusetts Dental Society Page 365 issue of February 29

APRIL 24-26 — Scientific Session Academy of Physical Medicine Hotel John Marshall Richmond Virginia

MAY 10-18 — American Scientific Congress Page 1043 issue of December 28

MAY 13 — United States Pharmacopoeial Convention Page 202 issue of February 1

JUNE 7-8 — American Heart Association Page 469 issue of March 14

JUNE 7-9 — American Board of Obstetrics and Gynecology Page 1019 issue of June 15

JUNE 8 and 10 — American Board of Ophthalmology Page 719 issue of November 2

JUNE 10-14 — American Physicians Art Association Page 332 issue of February 22

JUNE 23 25 — Maine Medical Association Annual meeting Rangeley Lakes

OCTOBER 21 — American Board of Internal Medicine Inc Page 369 issue of February 29

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

APRIL 3 — Page 422 issue of March 7

MAY 8 — Annual meeting Salem Country Club Peabody

FRANKLIN

MAY 14 — Franklin County Hospital Greenfield

HAMPSHIRE

MAY 8 at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MAY 15 at 12 15 p.m. at the Unicorn Country Club Stoneham

MIDDLESEX NORTH

APRIL 24

JULY 31

OCTOBER 30

NORFOLK SOUTH

APRIL 4

MAY 2

PLYMOUTH

APRIL 18 — State Farm

MAY 16 — Lakeville State Sanatorium Middleboro

SUFFOLK

APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Program and speakers to be announced later

MAY 2 — Censors meeting Page 244 issue of February 8

WORCESTER

APRIL 10 — Worcester Hahnemann Hospital

MAY 8 — Worcester Country Club

Meetings begin with a dinner at 6 30 p.m. and are followed by a business and scientific meeting

BOOK REVIEWS

Textbook of Nervous Diseases Robert Bing Translated and enlarged by Webb Haymaker From fifth German edition 838 pp St Louis C V Mosby Co, 1939 \$10 00

Dr Robert Bing, head of the Department of Neurology at the University of Basel, Switzerland, has long been known to English speaking physicians His little book on *Regional Diagnosis*, which first appeared in 1909 and is now in its eleventh edition, has been widely read in its English translation His *Textbook of Nervous Disorders* first issued in 1913 and now in its fifth edition, has not been so well known It is one of the great modern text books of neurology and perhaps takes its place in the first dozen books of its type An English edition has long been anticipated, and one is not disappointed in the translation by Dr Haymaker, who has changed somewhat the form of the book by taking the material out of the lecture form and putting it into various chapters He has added considerable data in regard to anatomy and physiology Several of the chapters have been extensively revised In spite of this, the attractive style of Professor Bing's presentation has not been entirely lost It is difficult to tell, moreover, where Professor Bing's part of the book ends and the translator's begins By bringing new material and augmenting the old material, the translator has added something to the value of the book for English and American readers

The book should be widely read for it contains much material not easily available in other textbooks No neurologist should be without this book, as it is one of the great fundamental texts on the subject

Epidemiology in Country Practice William N Pickles 110 pp Baltimore Williams & Wilkins Co, 1939 \$2 50

The observation that the general practitioner is in a position to make valuable contributions to medical knowledge is commonplace, but it is always pleasant to come on a fresh demonstration of its validity Dr Pickles, of Wensleydale, in the North Riding of Yorkshire, gives us a book which will inevitably bring to mind William Budd's *Typhoid Fever*

A gipsy woman driving a caravan into a village in the summer twilight, a sick husband in the caravan, a faulty pump at which she proceeded to wash her dirty linen, and my first and only serious epidemic of typhoid," he says, "left me with a lasting impression of the unique opportunities of the country doctor for the investigation of infectious disease" That Dr Pickles worthily makes use of his opportunities is apparent from a consideration of his technique, the conciseness and clarity of his statements of fact and the modest assuredness of his conclusions

Just what the "epidemic catarrhal jaundice" that he so carefully studied may be, is, as he himself admits, still sub judice, but he makes out an excellent case for its reality as an entity Epidemic myalgia, or Bornholm disease, is not only an independent discovery of his own, although originally described by an Icelandic practitioner in 1856, and subsequently by several Scandinavians, but a syndrome which in retrospect is recognizable in almost any physician's experience An epidemic at the Massachusetts General Hospital, Boston, was described in the *Journal* in 1933 by Crone and Chapman under the title "Epidemic Pleurodynia"

Apart from its scientific value, this little volume has the added grace of being written in the cursive narrative style characteristic of the best English medical tradition

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THE MASSACHUSETTS MEDICAL SOCIETY

Section of Medicine*

OXYGEN IN THE TREATMENT OF LOBAR PNEUMONIA

ALEXANDER M. BURGESS M.D.†

PROVIDENCE RHODE ISLAND

IN PNEUMONIA there is often a sufficient degree of anoxia to be definitely detrimental to the patient. This may be a factor of sufficient importance to decide the issue between recovery and death. The administration of oxygen will often completely relieve this anoxia. One must therefore consider the use of oxygen in this disease as an accessory method of treatment which, in the severer cases, may be indispensable.

Anoxia in pneumonia is of the arterial anoxic type, that is to say, it is due to interference with the passage of oxygen into the blood, so that the fact of a decreased oxygen supply to the tissues is due to a desaturation of the hemoglobin. This is the type of anoxia in which the inhalation of oxygen-rich air is effective—as opposed to anemic anoxia, in which the oxygen-carrying power of the blood is diminished, and to stagnant anoxia, in which the velocity of capillary flow is decreased. Anoxemia in pneumonia may be the result of three main factors, or more usually a combination of the three. It may result from an insufficient amount of oxygen entering the alveoli because of shallow breathing due to acute pleurisy. It may also be due to a partial shunting of unoxygenated blood through a lobe in the stage of early or red hepatization, when exudate in the alveoli prevents the entrance of air but circulation through the affected lobe is still maintained. Of course oxygen is effective only in so far as it can reach the unsaturated hemoglobin, and in cases where air is completely excluded from lung tissue, through which blood still flows, increased oxygen tension in the air is of no value. But it is probable that such a shunting is not often a dominant factor, and when it does occur oxygen-rich air certainly can aid in controlling the general desaturation that results from the dilution

of the unoxygenated blood which has passed through the affected lobe into the rest of the patient's general circulation. The third and principal cause of the anoxemia in pneumonia is probably widespread congestion and edema which make the lumens of the bronchioles smaller and the alveolar walls less permeable. In such cases an increased tension of oxygen in the air that gets into the alveoli means an increase in hemoglobin saturation and a decrease in anoxia. It is in the severe and late cases, and especially in those in which there is a spread of the pneumonia to several lobes or an added factor of cardiac weakness, that oxygen is of the greatest value.

I propose to present a brief summary of the effects of anoxia in pneumonia, and to consider the main indications for oxygen therapy and the simpler and more effective methods of carrying it out. While I shall speak of the clinical results of this treatment in general, I shall make no attempt to present any statistical evidence as to the value of oxygen in pneumonia. Stadie,¹ in 1922, in emphasizing the value of this type of therapy, pointed out that it did not lend itself to statistical analysis. At the present time, when both adequate serum therapy and sulfapyridine are proving their worth in such spectacular fashion it is quite impossible to determine the value of an accessory factor such as oxygen by any study of mortality figures. It is my purpose, also, to mention very briefly the use of high concentrations of oxygen in the treatment of abdominal distention, which is such an appalling complication of some cases of pneumonia.

That marked arterial unsaturation exists in many cases of pneumonia was demonstrated as early as 1912 by Hurter. This anoxemia has been shown to be as great as that which, when brought about experimentally, produced severe symptoms. Its action on the nervous and circulatory systems is of particular importance. Anoxia occurring in pneu

*This section meeting was held and the following two papers read during the annual meeting of the Massachusetts Medical Society, Worcester, Massachusetts, June 6, 1939.

†Visiting physician, Rhode Island and Charles V. Chapin hospitals, Providence.

monia affects the nervous system by producing symptoms the most prominent of which are headache, neuromuscular weakness and delirium. It is well to remember that in very toxic patients such symptoms are often due not to the toxemia but to the anoxia, and therefore may be preventable or correctable by oxygen. The effects on the circulatory system are equally important. As Meakins,² Long and Evans³ and others have pointed out, reduction of oxygen supply is the only factor that can be shown definitely to reduce cardiac gly-cogen and thus to reduce the efficiency of the heart. In elderly patients, especially, this is of significance in pneumonia. Clinically, anoxia is ordinarily seen to produce tachycardia, and it is usually observed that oxygen which causes cyanosis to disappear in pneumonia also reduces the pulse rate. Other effects of anoxia which are of importance in pneumonia are nausea and vomiting, and an increase in the rate, and to a less extent in the depth, of respiration.

The best clinical gauge of the extent of the anoxia in pneumonia is the degree of cyanosis. Roughly speaking, cyanosis that is just recognizable means a desaturation of about 10 per cent, that is, the normal saturation of 95 per cent has been reduced to 85 per cent. If cyanosis is very marked it may mean a desaturation below 70 per cent. Cyanosis, then, may be considered the cardinal indication for oxygen therapy. Dyspnea, however, also may be considered an indication if it is marked. Barach and Levy⁴ have called attention to the fact that in heart disease a potential anoxia may be present, but that by extra respiratory effort actual anoxia may be prevented. Such effort is exhausting and an extra load on the heart. In pneumonia, I believe, the same situation exists, and if dyspnea is severe, even without cyanosis, an attempt to relieve it by oxygen should be made.

Any method that sufficiently increases the oxygen tension in the inspired air and is not too disturbing to the patient is adequate. So far as I know, no method of giving oxygen intravenously over a long period that is practical or safe has been developed. Subcutaneous oxygen was studied a few years ago in our clinic, and appeared to be quite ineffective in relieving anoxia clinically or in decreasing the desaturation of the blood. This method has recently been studied experimentally by Barker and his associates,⁵ who reached the same conclusion. Among the methods of giving oxygen by inhalation I shall consider three: masks or face inhalers, nasal or oropharyngeal insufflation and the open box. Oxygen of course may be given effectively by one of the large tents or by placing the patient in an oxygen room. Such methods are excellent, but the equipment is so ex-

pensive that in a general hospital it is usually impossible to maintain enough of it to serve the many patients who need oxygen.

Masks or facial inhalers of various sorts have been employed for many years, and some have proved fairly efficient. The B.L.B. mask, oronasal type, which has been recently developed at the Mayo Clinic by Boothby, Lovelace and Bulbulian,⁶ has seemed to me by far the best yet devised.⁷ Recent tests that I have made have convinced me that this apparatus is very efficient, and many patients tolerate it very well. Furthermore, it is less wasteful of oxygen than are most of the other methods.

In utilizing the nasal catheter I have for years employed the method of oropharyngeal insufflation of Wineland and Waters.⁷ I have followed their technic carefully and have found the method usually well tolerated by most adults. The studies of Barker, Parker and Wassell on the alveolar air in patients treated by this method have shown that in order to obtain a therapeutically effective concentration, a flow of at least 4.5 to 6 liters per minute must be maintained, in some cases this must be increased to 8 or 10 liters. I have thought that in general this method was the best for the average adult, but if the need for oxygen is great the open box or the B.L.B. mask should be used. While the testing of the latter apparatus is not yet by any means completed, I have gained the impression that it is even slightly more efficient as to the delivery of oxygen than is stated by its originators.

The open-box method⁸ is the one of choice for infants and children. It is also effective in adults and in my clinic is employed in those cases in which a higher concentration of oxygen is needed than can be easily obtained by the nasal catheter. In the future it is probable that many such cases can be better treated by the B.L.B. mask. In most of the adult cases of pneumonia, however, oropharyngeal insufflation has been found satisfactory. In using the open box or any tent, it is of particular importance, as Barach and Levy⁴ have emphasized, to know exactly what the patient is getting, and tests of the oxygen content of the air in the apparatus should be routinely carried out at regular intervals. Many of the disappointing results of oxygen therapy are due to improper application of apparatus.

A review of the last 300 cases (up to February 1939) diagnosed as lobar pneumonia at the Rhode Island Hospital shows that 142 patients (47 per cent) received oxygen at some time during the course of the disease. Of the patients treated with

⁶It is to be noted that the oronasal and not the nasal type of B.L.B. mask should be used, as one cannot trust a sick patient not to breathe through the mouth.

oxygen, 90 received it by the open-box method, and 52 by the catheter method. Most of those on whom the open box was used were children, and all those who received oxygen by nasal catheter were adults. The open box was, however, of great value in a few of the more desperate cases in adults in whom treatment by nasal catheter seemed inadequate.

A further use of oxygen in pneumonia, fortunately a rather rare one, remains to be mentioned, namely high concentrations for the relief of abdominal distention, as suggested by Fine and his associates.¹¹ I¹⁰ have described a modification of the box method by which 98 per cent oxygen can conveniently be given, and recently Congdon and I¹¹ have reported the clinical results in 40 cases treated by this means. Although severe distention usually in our experience, can be relieved by ordinary means,—enemas and peristaltic stimulants,—we think that occasionally, when such means have failed, high oxygen concentrations may be life saving.

SUMMARY

In the treatment of lobar pneumonia, oxygen therapy is an accessory method of considerable value that is occasionally indispensable. Its value lies in the relief of the deleterious effects of anoxia, especially on the nervous and circulatory systems.

Cyanosis is the best clinical sign in determining the presence and degree of the anoxia in pneumonia, but severe dyspnea, even without cyanosis, is also an indication for the use of oxygen.

The most practical and inexpensive methods for giving oxygen are oropharyngeal insufflation through a nasal catheter, and the open box. To these must now be added the new B.L.B. mask, which appears to give very excellent results.

At the Rhode Island Hospital during the last three years almost 50 per cent of all patients with the diagnosis of lobar pneumonia have received oxygen either by nasal catheter or by open box. In the rare cases in which marked abdominal distention occurs, unrelieved by ordinary measures, 95 to 98 per cent oxygen given by the closed-box technic may relieve the situation.

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ATYPICAL BRONCHOPNEUMONIA OF UNKNOWN ETIOLOGY*

Possibly Due To a Filterable Virus

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DURING the academic year 1936-1937 the physicians associated with the Department of Hygiene of Harvard University observed a mild form of pneumonia which differed strikingly from pneumococcal lobar pneumonia and likewise from the usual types of bronchopneumonia. We had seen a few cases during the previous academic year that probably belonged in the same category. In the following college year the incidence of such cases increased, and during the fall and winter of 1938-1939 we saw a still larger number (Table 1) ‡ Bock¹ has called attention to this in his account of our experience with acute infections of the upper respiratory tract in 1938. There has been considerable speculation as to whether this form of

pneumonia constitutes a separate disease entity, and also as to its etiology. It has been referred to

TABLE 1 Cases of Atypical Bronchopneumonia Treated at Stillman Infirmary during the Academic Years 1935-1936 through 1938-1939

| ACADEMIC YEAR | MONTH | | | | | | | | | | | TOT. LS |
|------------------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---------|
| | SEPT | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | | |
| 1935-1936 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 5 | |
| 1936-1937 | 1 | 2 | 3 | 8 | 5 | 3 | 0 | 0 | 1 | 2 | 25 | |
| 1937-1938 | 0 | 2 | 9 | 0 | 6 | 0 | 8 | 5 | 4 | 1 | 35 | |
| 1938-1939 | 4 | 12 | 20 | 19 | 12 | 3 | 6 | 5 | — | — | 81 | |

as "virus pneumonia" and as "acute interstitial pneumonitis." We have chosen to use the term atypical bronchopneumonia.

A number of reports describing an atypical pneu

*Enables the 81 cases cared for at the Stillman Infirmary we have also had reports of 39 cases occurring among students who were treated by their family physicians.

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monia or pneumonitis have appeared in the literature. Most of the descriptions are quite similar to our own observations, but the cases described by Cass² and Reimann³ differed in some respects. The patients reported by Cass had marked prostration at the beginning of the illness, rather early appearance of the physical signs and a true leukopenia. Those reported by Reimann were very severely ill and seemed to have had a much more virulent infection than the ones we have seen. Those reported by Gallagher,⁴ Bowen,⁵ Allen⁶ and Smiley et al.⁷ and the group we have observed are strikingly similar. It is interesting that Stansfield⁸ in 1923 published some observations on a series of patients who had an infection closely resembling the one we are describing.

In an attempt to describe the clinical picture we have reviewed the histories of 132 cases, all of which were treated in the Stillman Infirmary of Harvard University during the last four years.

CLINICAL PICTURE

The illness usually starts as a mild acute infection, resembling "grippe," in which symptoms referable to the respiratory tract are mild or absent. The patient does not have the appearance of one who is developing a pneumonic process. The usual story is that during the preceding day or two he has had some headache, malaise, a little fever and perhaps mild chilly feelings, together with peripheral aches and pains. He may have had a slight cough, but this is frequently so mild that it is not mentioned by the patient unless he is questioned on the point. There is generally little sputum and no history of chest pain.

The physical examination reveals little except slight reddening of the pharynx and an elevated temperature. The pulse is not particularly elevated and the respiratory rate is normal. The diagnosis is usually made by x-ray on the third or fourth day, when a patch of hazy dullness is found in one lung field. It is well to remember that even at this stage there are no abnormal physical signs to be found on examination of the chest. There is some cough and perhaps a small amount of mucopurulent sputum. The sputum is not bloody or rusty.

The temperature returns to normal by the sixth or seventh day, and by this time coarse rales may be heard over a localized area. The patient remains in bed another week, is gradually allowed to resume activity, and at the end of another week to ten days has returned to a normal state of well-being.

A review of the details of the histories of these patients reveals that less than half of them had

had a cold or other respiratory infection during the previous three weeks (Table 2). About one quarter of them had had a relatively sudden onset, feeling moderately ill in the course of twenty-four hours or less. The explosive onset seen in lobar pneumonia did not occur. The remainder gave a story of the gradual development of symptoms over the course of two or three days. Occasionally the patient had been sick for a week or more with what he considered "grippe" or a bad cold, and had either been taking care of himself in his room or going to classes. He showed evidence of

TABLE 2 *Onset, Preceding History and Presenting Symptoms in 132 Cases*

| CLINICAL FACTOR | NO. OF CASES |
|------------------------------------|--------------|
| Onset | |
| Sudden (24 hours) | 35 |
| Gradual (several days) | 97 |
| History of preceding cold | 54 |
| No cold within previous 3 weeks | 78 |
| Symptoms | |
| Cough | 111 |
| Headache | 70 |
| Aches and pains | 70 |
| Malaise | 56 |
| Chill | 17 |
| Chilliness | 51 |
| Sputum at onset | 43 |
| Sore throat | |
| Mild | 43 |
| Marked | 7 |
| Coryza | 27 |
| Chest pain, moderate | 4 |
| Substernal discomfort or tightness | 20 |
| Nausea and vomiting | 3 |
| Diarrhea | 1 |
| Nausea, vomiting and diarrhea | 1 |

either a fully developed or resolving pneumonic process when first seen. This occurred in 6 cases. Almost all the patients developed a slight cough within the first few days. Headache, which might be severe, was very common; it was frequently frontal and occasionally unilateral. Some degree of peripheral aches and pains was present quite frequently, with a few cases of marked lumbar pain. Aching in or about the eyeballs was quite marked in several cases. Mild sore throat was relatively common and coryza might be present, but this was infrequent. Some patients complained of a slight tightness of the chest or substernal discomfort, but any degree of real chest pain was exceptional. Only a few experienced a shaking chill, although chilly feelings or chilliness occurred rather frequently. A small number had gastrointestinal symptoms at the beginning: nausea and vomiting, or diarrhea. Sweating was frequently present at the onset and sometimes became marked later in the illness. Prostration was occasionally present to some degree, but in general the picture was that of a mild infection.

The initial physical examination was noteworthy because so regularly normal. A temperature of 100 to 101°F and a little pharyngeal red

dening were the only frequent positive findings. A tinge of cyanosis was observed in only a few cases. Respiratory distress was absent and examination of the chest was normal. The abdomen was soft and flat. A palpable spleen was noted in a few cases.

The course of the disease was variable. In a small number of cases the temperature dropped to normal in the first twenty-four to forty-eight hours after the patient went to bed, and remained normal thereafter. Sometimes the temperature fluctuated irregularly, rising as high as 104 or 105°F., but usually covering a range of 101 to 103 and remaining elevated for five to seven days. The pulse rate was low in proportion to the fever, and was frequently a very reassuring sign in the few patients who appeared to be seriously ill. The respirations were almost never significantly increased. This was one of the most constant findings in these cases. During the earlier part of the febrile period considerable headache with some malaise and sweating was present, and later intermittent bouts of cough with varying amounts of sputum were common. The patient's subjective discomfort, however, was less than one might expect on casual inspection of the temperature chart and x-ray film.

In a little more than half the cases physical examination of the chest revealed dullness on percussion. This usually appeared on the second to the fifth day and was frequently barely detectable. Marked widespread dullness appeared in only a small proportion of the cases. Breath sounds were normal at the beginning, but tended to become diminished with the progress of the disease and in some cases were almost suppressed. Some degree of diminution of breath sounds was found in a majority of the cases, but any marked bronchovesicular or frank bronchial breathing was uncommon. The development of bronchial breathing sometime in the course of the illness was observed in only 15 per cent of the cases, and when present often disappeared in twenty-four to forty-eight hours. Significant alterations of the tactile fremitus and marked changes in the whispered and spoken voice were likewise found only occasionally. Rales were late in appearing, not being heard until the fifth, sixth or seventh day in bed, and sometimes not until the eighth to twelfth day. The rales were coarse and were apt to persist for one or two weeks before completely clearing. A small proportion of the cases never developed any abnormal physical signs.

Although in most cases the sputum was very scanty throughout the course of the illness, the production of profuse, mucopurulent sputum occurred occasionally. No significant degree of

tympanites was encountered in any of the patients. Nervous symptoms, such as those described by Reimann,³ we have not seen at all. In a few cases there was extension of the process to another lobe, but this was exceptional.

The average duration of infirmity care was ten to fourteen days. Several patients had a rather desultory, lethargic course with prostration and ran a low grade fever for two or three weeks. These required a prolonged convalescence. Severe reactions with great prostration, prolonged high fever or the appearance of critical illness were rare.

The following abstracts are illustrative of typical cases.

CASE 1. E. P., a college student, aged 21, was admitted to the Stullman Infirmary on November 23, 1938. He had had a "cold" beginning 2 days previous to admission. The day before entry he had had chilly feelings, a sensation of tightness under the sternum and a dry hacking

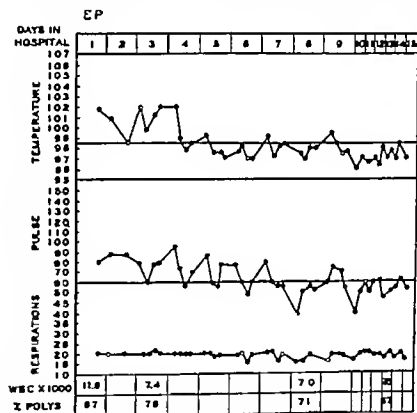


CHART 1

cough. He had some headache, fatigue and mild malaise when first seen. He had had no sore throat, chest pain or sputum, and he did not feel particularly ill. On admission the temperature was 102°F., the pulse 80 and the respirations 20 (Chart 1).

Physical examination revealed a young man sitting up in bed in no particular discomfort other than an occasional cough. The skin was warm and moist. There was no adenopathy. The nose and throat were essentially normal and examination of the chest was negative. The rest of the physical examination was essentially normal. An x-ray film of the chest taken on the 3rd hospital day revealed an area of soft, hazy density at the right base occupying the cardiac angle (Fig. 1).

On the 3rd and 4th hospital days the patient had rather severe headache, perspired freely and felt moderately sick. His cough was more marked and he was producing small amounts of mucopurulent sputum, which was

not bloody On the 5th day slight dullness to percussion and a moderate number of coarse, moist rales were found at the right lung base posteriorly At this time the temperature dropped to normal, the headache had subsided and the patient felt very much improved Thereafter he made steady improvement and had an uneventful recovery The dullness disappeared after a few days, but coarse, moist rales persisted until the 12th day The patient was

coarse, moist rales appeared in the right lower chest, and a small number were also heard in the left lower chest. The rales persisted until the 12th day The patient was

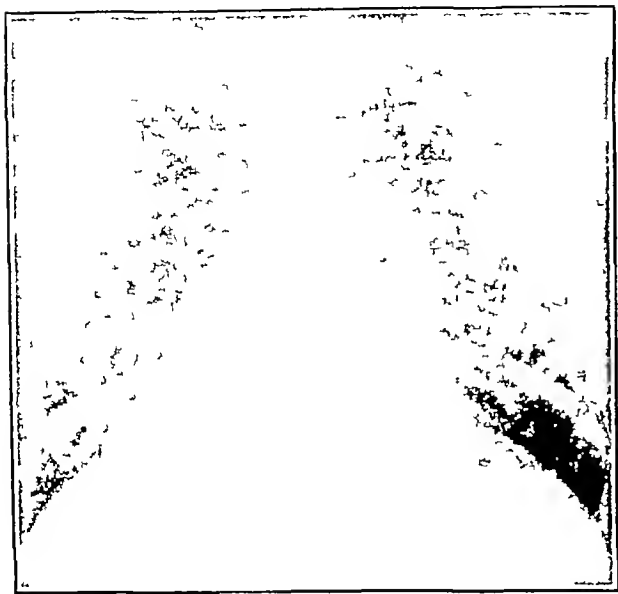


FIGURE 1 Case 1

This chest film was taken on the third hospital day

discharged on the 15th day and returned to his classes 1 week later

The sputum contained pneumococcus, Type 6 There were no complications

Comment This patient represents a fairly typical mild case. The lesion occupying the cardiophrenic angle was a very common finding in such cases

CASE 2 P S, a college student, aged 20, was admitted to the Stillman Infirmary on November 28, 1938 Ten days previously he had had some coryza and sore throat. This had subsided, but for the week preceding admission he had had some cough without expectoration For the previous 3 days he had felt that he had some fever but very little malaise.

The day of admission the temperature was 100°F, the pulse 80, and the respirations 20 (Chart 2) Physical examination revealed a young man who was coughing but who did not appear to be very ill A few fine rales were heard at the base of the right lung, but there were no other abnormal physical signs

The temperature rose to 102°F the day after admission and the patient felt moderately ill At that time some dullness to percussion and diminution of breath sounds were found at the right lung base. An x ray film revealed a large area of density extending upward and downward from the right hilus along the right border of the heart (Fig 2) By the 3rd day the patient felt very much improved, and except for some persistence of the cough had very few symptoms thereafter He continued to have an irregular temperature up to 101°F, but this had returned to normal by the 6th day Numerous medium and

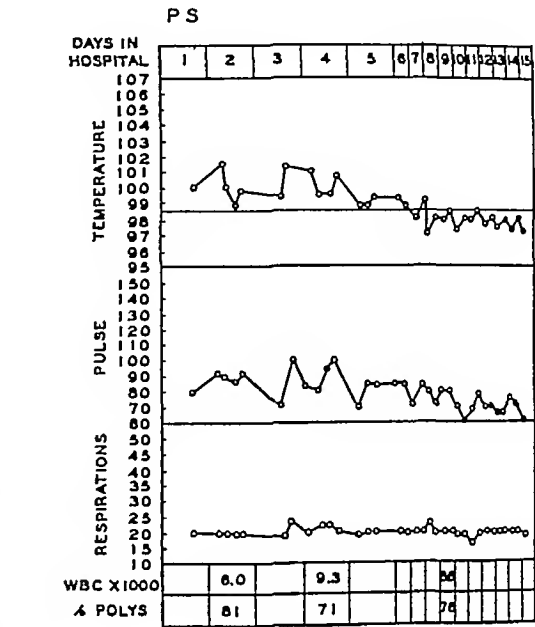


CHART 2

discharged on the 15th day to continue convalescence with relatives

No pneumococci were found in the sputum. There



FIGURE 2 Case 2

This chest film was taken on the second hospital day

was an uneventful recovery without any complications.

Comment This patient also is an example of a fairly typical mild infection. The pulmonary lesion presumably began several days before the patient went to bed. The x-ray film illustrates the fan proceeding from the hilus, which has been described by others

CASE 3. G. M., a law student, aged 22 entered the Sullman Infirmary on September 27, 1938. He had felt well up to the previous day, when he had suddenly begun

the chest was negative. The physical examination was otherwise essentially normal.

On the 2nd day the patient still had considerable head-

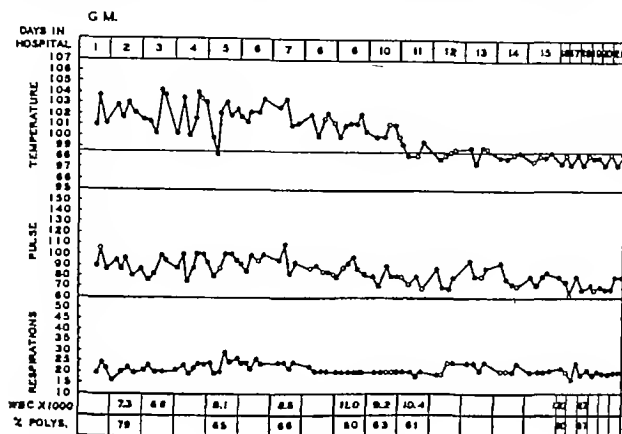


CHART 3

to have aches and pains in his muscles and all over his body developed some headache, and felt feverish. During the night he perspired freely and the next morning

ache and developed a little cough. An x ray film showed an indefinite area of density extending down from the right hilus to the cardiophrenic angle. He continued to have an irregular temperature, up to 104 F had considerable cough and headache, and perspired freely. On the 5th day some dullness to percussion and diminution of breath sounds were found over the right lower chest. A second x ray film taken the same day showed considerable increase in the consolidation at the right lung base (Fig 3). On this day the temperature dropped to normal. This was shortly followed by a chill and the temperature again rose to 103 F.

The patient continued to feel moderately ill, with profuse perspiration and severe headache. The cough persisted, and he raised moderate amounts of mucopurulent sputum, which on a few occasions was blood streaked. Abnormal physical signs became more marked and on the 7th day there was dullness posteriorly extending downward from the angle of the scapula with a moderate number of medium moist rales in that area. A third x ray film taken on the 10th day showed a slight increase in the amount of density over the previous observation. The patient continued to have an irregular fever which gradually subsided by lysis, reaching normal on the 12th day. Large numbers of medium and coarse, moist rales appeared throughout the entire right lower chest, persisting until the 19th day. There was no bronchial breathing at any time. The white-blood-cell count which had been within normal limits, rose to 17,000 on the 16th day.

The patient was discharged on the 21st day to Lyman House for convalescence. He had lost 12 pounds and felt rather weak, but otherwise was symptom-free. He had an uneventful convalescence and no complications.

Repeated sputum examinations revealed no pneumococci.

Comment This patient was moderately ill and probably had a spread of the process about the 5th day. The relatively low pulse and respiratory rates, the absence of

FIGURE 3. Case 3

This chest film was taken on the fifth hospital day

felt better. He went to his classes, but during the morning felt very sick with general malaise and fever.

At admission the patient felt moderately ill but had no cough. The temperature was 101 F., the pulse 90 and the respirations 20 (Chart 3). The skin was hot and moist. The pharynx was moderately reddened. Examination of

pneumococci in the sputum and the normal white blood-cell counts, with a rise to 17,000 on the sixteenth day, are of interest.

CASE 4 R H., a graduate student, aged 28, was admitted to the Stillman Infirmary on March 18, 1939. One

many alpha hemolytic streptococci and small numbers of staphylococci and *Neisseria catarrhalis*. Two blood cultures were negative. A Widal test was negative. The white blood-cell counts were consistently normal.

The patient was discharged April 8. There were no complications, but the convalescence was prolonged.

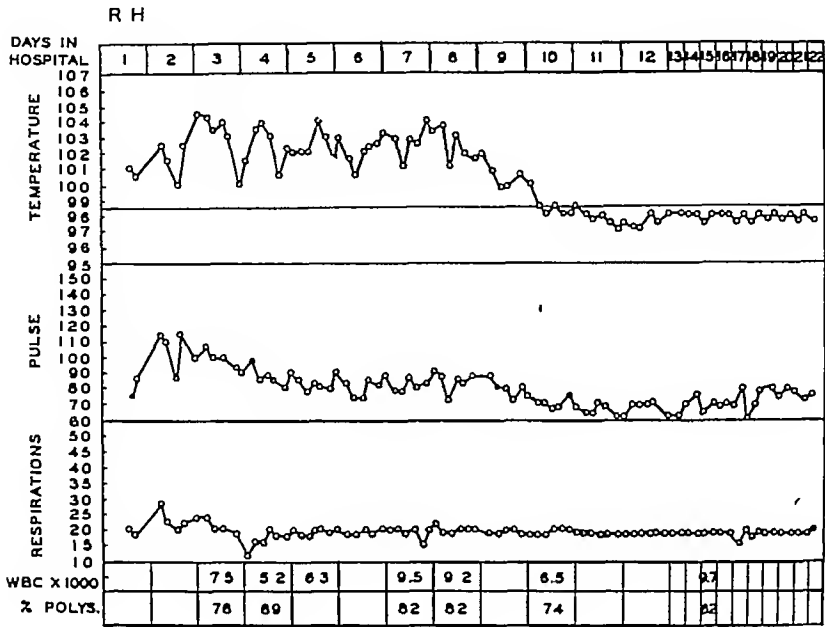


CHART 4

month previously he had had an upper-respiratory infection and had been in bed for 1 week. However, he made a complete recovery and felt well until the day before admission. On that day he experienced a tight sensation in his chest. The following day he found that he had a fever and therefore came to the infirmary. He had mild coryza, considerable malaise and ached all over. He had no cough.

Physical examination revealed a man who looked sick. The temperature was 101°F, the pulse 75, and the respirations 20 (Chart 4). The skin was hot and dry. There was slight nasal discharge, the tongue was coated and dry, and the pharynx showed mild generalized reddening. A few small lymph nodes were palpable. Examination of the chest was negative.

On the 2nd day in bed the patient developed a slight, dry cough, had a chill, and the temperature rose to 104°F. He had no appetite and felt prostrated. An x-ray film of the chest taken on the 3rd day showed a small area of haziness at the right cardiophrenic angle. During the next 3 days he had some nausea, vomiting and diarrhea. On the 5th day, slight dullness and bronchovesicular breathing were heard over the right lower chest. The physical signs increased, with marked dullness all over the right lower chest, bronchial breathing and increased whisper. Tactile fremitus was equal on both sides.

The patient continued to have an irregular fever, ranging from 101 to 104°F, for 8 days. He was listless, apathetic and prostrated by the illness. X-ray films showed an increase in the consolidation, which occupied the position of the middle lobe and a portion of the lower lobe of the right lung (Fig 4).

Repeated sputum examinations were negative for pneumococci and acid-fast bacilli. Sputum culture revealed

Comment This man felt and looked severely ill. The relatively slow pulse was reassuring, and the normal leuko-



FIGURE 4 Case 4

This chest film was taken on the fifth hospital day.

cyte count throughout the illness is of interest. Severe illness such as this case illustrates was seen rarely in this series.

ROENTGENOLOGICAL OBSERVATIONS

Since we frequently did not suspect a pulmonary lesion for several days, it has been difficult to determine accurately how soon x-ray changes can be detected after the illness begins. In a few cases where x-ray films were taken early, changes were found within twenty-four hours after the initial symptoms. Certainly x-ray changes are present for several days before abnormal physical signs can be detected. The roentgenogram usually discloses an area of hazy density extending out from the hilus region into the lower lung field, and occasionally into the midlung field. The margins of this area are ill defined, shading off gradually into the surrounding normal lung. As the disease progresses, the area increases in density, may increase in size and becomes more sharply defined. Resolution occurs as in other types of pneumonia, the density gradually diminishing and becoming more mottled and linear in type. A week to ten days after the peak of the illness the lung may show only a few linear bands of density in the previously involved area. The characteristic finding is lobular rather than lobar distribution of the lesion. Although a whole lobe was involved in a few cases, the majority showed only a section of one lobe to be affected. Basal lesions were commonest, upper lobe lesions were observed in only 9 cases. Lesions, usually termed central pneumonia, limited to the hilus region were found in 13 cases. More extensive shadows occupying the midlung field but not reaching the base were observed in 17 cases. The remaining lesions occupied either the right or left lower lung field, being found more frequently on the right. Bilateral lesions were observed in 13 cases. In the cases of patients who ran a mild clinical course it was quite common to find a small area of consolidation limited to one cardiophrenic angle. Evidence of consolidation and collapse were found in 7 cases.

LABORATORY DATA

The average case presented a normal or slightly elevated leukocyte count. Seventy-five per cent of the patients had an initial leukocyte count of 5000 to 12,000, the majority being from 7000 to 11,000. The percentage of polymorphonuclear cells was usually 70 to 75. Among those who had an initial leukocyte count higher than 12,000 were several patients with walking pneumonia,* several who had had an antecedent infection in the sinuses, pharynx or middle ear, and those who had been vomiting. In one third of the cases in which the initial leukocyte count was not over 12,000 there was a curious rise in the count during convalescence, occasionally reaching 17,000 to 20,000. While

this might be taken to herald the onset of some complication, none appeared in this group. The percentage of polymorphonuclear cells found after the leukocyte count had risen was only slightly increased.

Through the facilities of the Massachusetts Department of Public Health we were able to have sputum examinations made on a large number of cases, but owing to several factors we were unable to carry out extensive bacteriological studies. Seventy sputum examinations were made in 53 cases, 41 of which were reported to contain no pneumococci and 29 to contain varying numbers of one or more type specific pneumococci. No cases of Type 1 were reported, but 1 of Type 2 and 1 of Type 3 were found, and the remainder were scattered throughout the higher types—Types 4 to 32. Sputum cultures were done in a small group of these cases at the Massachusetts General Hospital, and a variety of organisms which can be found in any nonspecific respiratory-tract infection were reported.

In 11 cases* Enders, Sullivan, Hammon and Meakins,³ of the Department of Bacteriology, Harvard Medical School, attempted to demonstrate an etiologic agent by the inoculation of a variety of laboratory animals, including mice, rabbits, guinea pigs, ferrets and *Macaca mulatta* and of the chorio-allantoic membrane of the hen's egg. The injection of blood, sputum and nasopharyngeal washings failed to induce in these species any recognizable pathologic changes.

Routine urine analyses were done on admission and at intervals throughout the infirmity stay. These were all negative except for occasional transient albuminuria and very occasionally, small numbers of red blood cells in the centrifuged sediment.

TREATMENT

The basis of treatment has been the ordinary measures usually instituted in simple acute infections—bed rest, liberal fluids and normal diet, with added sodium chloride when there was any marked salt loss through perspiration. Codein has been used to help control cough, and the salicylates have been used to control the aching and malaise so common during the early part of the disease.

Oxygen therapy has not been necessary in any case, specific serum has not been used. Sulfanilamide was used in 1 case without benefit, and sulfapyridine was not used.

COMPLICATIONS

One of the most striking features of the clinical picture was the absence of any serious complica-

*This group was made up of students at the Stillman Infirmary and nurses from a Boston hospital.

tions In 1 case we had x-ray evidence of questionable fluid, but in no case did we note the occurrence of empyema In 8 cases either marked follicular tonsillitis, acute sinusitis or otitis media was present when the patient was admitted to the infirmary, the pneumonic process either developing or being discovered subsequently Sinusitis of moderate degree occurred in the course of the illness in 4 cases Mild otitis media not requiring paracentesis occurred in 5 In 2 cases it was more severe, one requiring paracentesis and the other draining spontaneously Mastoiditis did not occur Urticaria occurred in 1 case Ulcerations on the soft palate were observed in 1 case In 1 case streptococcal pharyngitis with cervical adenitis occurred

There were no deaths in this series *

EPIDEMIOLOGY

During the academic year 1938-1939 a detailed follow-up study on 45 of the patients was carried out by Ernest B. Millard, Jr., and James H. Mitchofer,¹⁰ students at the Harvard Medical School They noted that the highest incidence of the pneumonia cases occurred in November and December, whereas the highest incidence of other respiratory infections occurred in February and March This suggests that the illness in question is not etiologically related to the common cold They were able to trace eight miniature epidemics in which exposure and contacts were studied carefully, and concluded that the infection is contagious, though not highly so, and is probably transmitted from one person to another by direct, casual contact. Because of the presence of multiple contacts, determination of an incubation period could not be carried out with any degree of certainty, but in four series of cases where multiple contacts were few, evidence was found to suggest an incubation period of seven to eleven days

SUMMARY

During the last four years a rather mild form of pneumonia has been observed among the students at Harvard University During the academic year 1938-1939 it was much more prevalent, 81 cases having been cared for in the Stillman Infirmary and 39 cases reported by family physicians The records of 132 infirmary patients have been studied with a view of describing the clinical course of the illness

It began as a simple acute infection, with min-

During the four years under consideration there have been 235 cases of pneumonia of all kinds occurring among Harvard students. This includes patients taken care of by their own physicians at home or in hospitals and those at Stillman Infirmary Three deaths occurred all in the year 1935-1936 one a Type 1 lobar pneumonia, another a Type 3 lobar pneumonia and the third an overwhelming streptococcal pneumonia.

imal respiratory symptoms, but usually with the early appearance of cough and later some degree of expectoration The chill, chest pain, bloody sputum and prostration of pneumococcal lobar pneumonia were as a rule absent A pulmonary lesion, most often beginning at the hilus and advancing outward toward the lateral chest wall or the diaphragm, was demonstrable early in the illness by x-ray examination Physical signs were minimal, and absent altogether in certain cases When present, they were late in appearing Mild dullness to percussion, some diminution in breath sounds, followed by the appearance of coarse rales on the fifth, sixth or seventh day, were the usual findings The course was ordinarily mild, with return of the temperature to normal in five to seven days The pulse was only moderately accelerated, rarely rising above 90 or 100 The respiratory rate was almost invariably normal Severe prostration was present in a few cases, but tympanites, delirium and other evidences of critical illness were not seen

The leukocyte count was either normal or slightly elevated, with 70 to 75 per cent polymorphonuclear cells In about one third of the cases there was a rise in the leukocytes during the latter part of the illness without the appearance of complications to explain it Complications were few, and when present were mild The more serious complications, such as empyema, lung abscess and bronchiectasis, did not occur The majority of sputum specimens examined contained no pneumococci, somewhat less than half showed a pneumococcus, usually one of the higher types Sputum cultures yielded a variety of organisms, and a small number of blood cultures were all negative Attempts to isolate a filterable virus were unsuccessful

A short convalescence with relatively rapid return to normal daily living was the rule No deaths occurred

We believe that this infection represents a separate disease entity, but judging from other reports, do not believe that it is a new disease. It does not appear to be related to the common cold, nor to epidemic influenza Epidemiological observations indicate that it is contagious and suggest an incubation period of seven to eleven days What bacteriological studies have been done fail to incriminate any of the known bacteria as etiologic factors This negative evidence, plus certain characteristics of the clinical picture, at least suggest that this is a virus disease So far, however, no positive evidence in favor of this impression has been obtained

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SULFANILAMIDE THERAPY IN CHRONIC UNDERMINING STREPTOCOCCAL ULCER*

Report of a Case

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CHRONIC, undermining, streptococcal ulcers, though uncommon in general practice, offer a real problem in therapeutics. Numerous bacteriostatic and bacteriocidal drugs, vaccines, maggot, radiation therapy, and even surgical and electrosurgical excision, have frequently enough proved ineffectual in preventing the spread of these ulcers.

The comprehensive studies of Meloney and his co-workers¹⁻⁴ have added much to the knowledge of this condition. In his experience a microaerophilic, hemolytic streptococcus has been the principal bacterial agent. He found that zinc peroxide, which liberates nascent oxygen in close proximity to these organisms buried in the infected ulcer tissue, was very effective in healing many of the ulcers. At least two other authors^{5, 6} report success with this preparation. It is evident, however, that not all these ulcers are cured by zinc peroxide.⁷ The acknowledged variability in the oxygen liberating potency and therapeutic efficiency of commercially available zinc peroxide may be one reason for this failure. Furthermore, the technical requirements necessary for the successful application of this drug as outlined by Meloney may prove difficult in the home and in some small hospitals.

Experience with the case to be reported and that of Goodman⁸ indicates that sulfanilamide is very effective in the healing of certain of these chronic undermining ulcers. The ease of administration of this drug further simplifies the treatment. The only necessary laboratory studies are periodic blood counts. Blood sulfanilamide determinations may be performed if desired. Wound cultures are important in evaluation of results.

In this paper a successful outcome in the case of one of these ulcers from the administration of

sulfanilamide is described. Approximately 8400 gr of sulfanilamide was given over a period of three months without more than a slight transient effect on the bone marrow and on liver and kidney function.

CASE REPORT

M. D., a 15-year-old school girl was admitted to the Surgical Service at the Massachusetts Memorial Hospitals on August 17, 1938. Two and a half months previously she had sustained a floor burn in the school gymnasium, the affected area being just below the knee on the anterolateral aspect of the left leg. Iodine was applied by the patient, but a moderate degree of infection developed. She was then treated in a clinic and ammoniated mercury ointment dressings were used during a 2 week period. There was progression of the lesion despite this treatment, an ulcer with undermined edges and a central sinus being formed. Surrounding acute cellulitis required wet dressings for a few days. Incision and drainage of the central sinus was done on June 18. Within a week, an exacerbation of the acute cellulitis occurred requiring hospitalization for several days. During the following 6-week period—prior to admission at the Massachusetts Memorial Hospitals—the ulcer remained in an indolent state, not improving with ointments and other local treatments. The patient walked with difficulty owing to pain on moving the knee. There was little spontaneous pain in the ulcer. Her general health was not impaired. The past history was negative except for an intermittently running ear of several years duration.

Physical examination revealed a well-developed and well-nourished girl. The color was good. There was a moderate degree of acne vulgaris. Systemic examination was generally negative aside from the left lower extremity. On the anterolateral aspect of the left leg was a roughly ovoid ulcer 9.0 by 7.0 by 0.8 cm. its upper margin being just below the head of the fibula. It extended part way onto the calf laterally where the bed of the ulcer was apparently formed by the aponeurosis of the soleus muscle. Soft granulations with a moderate degree of infection lined the open bed. The lateral margin was deeply undermined and draining thin yellow gray pus, with a slightly musty odor. There was shallow undermining in two places along the superior and medial margins of the ulcer. The surrounding skin for a distance of 3 to 6 cm showed a scaling eczematoid lesion. Motion was free in the joints of this extremity. Muscle function seemed

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normal, although there was slight atrophy of disuse. No regional lymphadenopathy was found.

Urinalysis was entirely negative. The blood nonprotein nitrogen was 27 mg per 100 cc., and the blood sugar 111 mg. The Wassermann and Kahn tests were negative. The white-cell count was 10,700, with 75 per cent polymorphonuclear leukocytes, 23 per cent lymphocytes and 2 per cent endothelials. The hemoglobin was 78 per cent, and the red-cell count 4,450,000. X-ray films of the knee region revealed only bone atrophy.

The day after admission, under nitrous oxide and ether anesthesia, the sinuses at the ulcer margins were laid open and the infected granulations were curetted out. Cultures from this material showed an aerobic hemolytic streptococcus, *Staphylococcus aureus* and *Staph albus*. No anaerobic or microaerophilic organisms were identified. Examination of smears failed to demonstrate fungi, yeasts or tubercle bacilli. The pathologist's report on sections of this material was "acute and chronic inflammation, granulation tissue."

Under the influence of wet saline and Dakin's solution dressings, during the next 2-week period the ulcer bed became cleaner, but did not decrease in size. The surrounding skin was somewhat macerated. The culture results continued to be the same, although but few organisms were found in the smears.

On September 12, 1 month after admission, dressings of active zinc peroxide paste were instituted according to the technic of Meleney.² The granulations became clean and solid, and healthy epithelium began to grow in from the margins. Progress was so favorable that the area was pinch-grafted on September 19, the zinc peroxide being continued with only a 24 hour interruption. After an 8-day period the grafts became liquefied. There was an exacerbation of the infection in the ulcer bed. The granulations were gelatinous and purple-gray, and exuded an excess of thin, gray pus with a musty odor. Cultures taken at this time yielded *Bacillus pyocyaneus*, in addition to a hemolytic streptococcus and *Staph aureus*. Technical difficulties were then encountered in the use of the zinc peroxide. The material obtainable was very low in nascent-oxygen production (by Meleney's test-tube determination). Either because of this factor or because of the presence of the new organism, the zinc peroxide proved ineffective. Dressings moistened with 2 per cent acetic acid were used for several days, with definite improvement, and by the end of September the ulcer had decreased to roughly 4 cm. in diameter. The bed was shallow. In the next 2 weeks, however, a relapse occurred, the area becoming larger despite resumption of both acetic acid and zinc peroxide dressings for adequate treatment periods. *B. pyocyaneus* continued to be present in cultures for the next 6 weeks.

X-ray therapy (344r in seven treatments—200 kv, unfiltered) was given over a period of 10 days. For control purposes saline dressings only were used locally. The response to the x-ray treatment was unfavorable, the ulcer becoming larger during this period (Fig 1). On October 19, the patient was started on sulfanilamide therapy, given with appropriate amounts of sodium bicarbonate by mouth. This was continued with the dosage ranging from 80 to 100 gr daily in divided doses until the middle of January, 1939. During that time the ulcer healed in gradually, the response to the sulfanilamide being very convincing, and certainly more consistent than that to any of the other treatments used. It was necessary to discontinue the drug for a number of days on several occasions because of the destructive effect on the red blood cells, which fell as low as 2,600,000 per cubic millimeter.

Four transfusions were given, the first on December 19, with a satisfactory resultant rise in the red-cell count. The white cells were not affected, and the patient had no constitutional reaction of significance. Mild cyanosis was observed at times, and moderate anorexia occurred when



FIGURE 1 The Ulcer at the Start of Sulfanilamide Treatment—October 21, 1938

large doses were being given. On several occasions during the enforced rest period from sulfanilamide minor exacerbations of the ulcer activity occurred, the change from the infected, malignant-appearing, spreading, purple gray granulations present at such a time to a relatively clean ulcer, within 48 hours after resumption of the sulfanilamide, was quite dramatic. The sulfanilamide level, taken frequently during this period, ranged from 0.5 to



FIGURE 2 The Ulcer in an Advanced Stage of Healing after Three Months of Sulfanilamide Treatment—January 16, 1939

34 mg per 100 cc, being generally proportional to the dosage and the healing effect.

The majority of the pinch grafts planted November 26, during the course of sulfanilamide treatment, took, and acted as foci from which epithelium spread over the ulcer. Small doses of sulfanilamide (40 gr daily) were effective during January and February, but when the drug was entirely omitted exacerbation of the ulcer took place (Fig 2). By February 25 only two tiny granulating

points remained, and it seemed feasible to discontinue the sulfanilamide. A total of 8400 gr had been given. Cultures showed only *Staph aureus*. The eczematoid reaction of the surrounding skin persisted for some time thereafter, but the ulcer was entirely healed by the time of discharge, in March 1939. The function of the leg was normal. The patient's general health was excellent. The peripheral blood picture was normal.

The patient returned to the hospital 3 months later for a general check-up. At that time the skin over the previous ulcer area was solid although still somewhat thin. There was moderate fibrosis of the subcutaneous tissues. The leg function was normal. Tests of kidney and liver function were within normal limits.

COMMENT

The ulcer described above stubbornly resisted various forms of treatment for two months. Dakin's

After the initial treatment period of two months, the ulcer was only a little smaller than on admission. There was less undermining, but the granulations of the base were still heavily infected. Sulfanilamide treatment begun at that time gained control of the inflammatory process within four days. Epithelialization, however, was slow. Through their experiments with dogs, Bricker and Graham⁹ have shown that sulfanilamide exerts some inhibitory effect on wound healing. This may well be true in clinical practice also. The periods of rest from the sulfanilamide, necessitated by significant drops in the red-cell count, also added to the total healing time. Resumption of the drug on each occasion demonstrated convincingly its prompt effect on the inflammatory process.

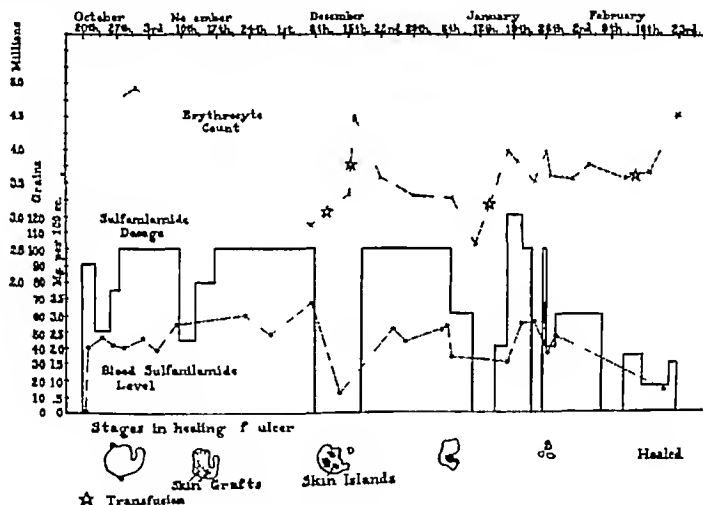


FIGURE 3 Sulfanilamide Dosage in Relation to Erythrocyte Levels

solution, simple saline dressings and dilute acetic acid all seemed effective in cleaning up the lesion at times, even promoting a degree of healing. Exacerbation of the ulcer activity then invariably occurred. Zinc peroxide at first appeared even more effective. When however, an attempt was made to punch-graft the clean ulcer base, the grafts promptly sloughed and the ulcer again became active. Zinc peroxide paste was ineffective when tried on three subsequent occasions. This failure may well have been due to the inferior oxygen liberating power of the material available. The complicating organism, *B. pyocyaneus* present in the ulcer at this time may also have had some influence. X ray therapy was entirely ineffective

It is rarely necessary to administer sulfanilamide in such high total dosage (8400 gr) for so prolonged a period (four months). When one recalls the great interest shown in toxic side effects of this drug during recent months,¹⁰ this case is of some importance in indicating the quantities which can be administered safely to a nonsusceptible individual. Moderate reduction in the red cell count and a slightly diminished renal function during the treatment period were the only significant toxic effects. Three months later a check up of the peripheral blood picture and the renal and hepatic functions by standard methods showed normal findings.

Despite daily dosages of 100 gr of sulfanilamide

for long periods, it was never possible to raise the blood serum level above 3.4 mg per 100 cc. The low serum sulfanilamide level may have accounted in part for the absence of serious side effects.

Approximately 60 gr of sulfanilamide daily was required to maintain the ulcer in a healing phase, with a dosage of 80 to 100 gr (2 or 3 mg per 100 cc serum level) as a safe margin. This affords an interesting comparison with Goodman's⁸ findings. In his 2 ulcer cases, which were similar to that described herein, daily sulfanilamide dosage of 40 to 60 gr was adequate to promote healing. Daily dosage of 120 gr for a short period in our case resulted in no additional improvement in the healing and gave the patient anorexia and mild cyanosis. There was no febrile reaction on resumption of the sulfanilamide in full doses after a rest period, or at any other time. The patient experienced no reaction after any of the four transfusions, nor was there any ill effect from simultaneous administration of ferrous sulfate and the sulfanilamide, over fairly long periods.

Figure 3 illustrates the course of the sulfanilamide administration, together with the levels of the blood sulfanilamide obtained and the effect on the erythrocyte count. The leukocyte count ranged between 6000 and 16,000. Since it did not seem significantly influenced by the sulfanilamide, it is not shown in the graph.

No microaerophilic hemolytic streptococci were recovered from this ulcer. The strain was beta hemolytic and seemed to grow well in air. In one culture a poor growth of *Str. viridans* was identified, after periods of both zinc peroxide and sulfanilamide treatment. Clinically, however, the ulcer resembled the type described so adequately by Meleney and from which he was able to isolate

microaerophilic organisms. The admittedly good control of the ulcer activity obtained by the first and potent lot of zinc peroxide seems to justify further the classification of this ulcer with Meleney's group.

A combination of zinc peroxide dressings—when a more constantly potent product can be developed—and sulfanilamide, administered systemically, may well prove the ideal treatment for this serious disease.

SUMMARY

The healing of a resistant, chronic, undermining streptococcal ulcer following the administration of sulfanilamide is reported.

The salient features of this case were the prompt and convincing subsidence of the inflammatory process and institution of healing in the ulcer from the use of sulfanilamide, in contrast with other methods of treatment, and the absence of any but transitory and mild toxic effects from the administration of 8400 gr of sulfanilamide during a period of four months.

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CLINICAL SIGNIFICANCE OF ORAL LESIONS IN
ACUTE LEUKEMIA

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THE recognition of the importance of mouth lesions in various systemic disorders is of comparative recent date. Among others, Marshall and Lucia¹ have emphasized that many diseases of the blood present their most important signs and symptoms in the mouth. Love found that 82 out of 152 cases of various types of leukemia showed oral lesions, and Musser² states that in acute leukemia oral lesions are usually present. A study of blood dyscrasias in the past four years has amply borne out these statements.

Leukemic manifestations in the mouth are mainly confined to the gingival tissues and mucous membranes. The commonest lesion is bleed-

Clinically, oral lesions in acute leukemia are important not only because they occur in a large percentage of cases, but also because very frequently they are the earliest sign of the disease. Of the 9 patients of this group with oral signs, 7 first visited the doctor or dentist because of bleeding from the gums, trench mouth or pain in the jaw. The following cases illustrate this.

CASE 1 J. C., a 23-year-old man, complained of a sore mouth, pain in the teeth and swollen bleeding gums. He was treated by a dentist for "trench mouth" and his mouth improved. However 3 months later his gums again bothered him and in addition he developed anorexia, became tired easily and felt run down. Because of weakness and loss of weight he was admitted to the Carney Hospital 7 months after the onset of his sore mouth.

Physical examination revealed an acutely ill man. His gums were swollen and pale, but there was no ulceration or evidence of petechial hemorrhage. There was a murmur at the cardiac apex, but no other findings in the heart and lungs. The liver and spleen could not be felt, nor were there any palpable lymph glands. The red-cell count was 1,650,000 the white-cell count 17,200 and the hemoglobin 35 per cent (Sahli). A stained smear revealed markedly diminished platelets, anisocytosis and poikilocytosis. A differential count showed 12 per cent lymphocytes, 10 per cent adult polymorphonuclears, 39 per cent band forms, 30 per cent myelocytes and 9 per cent myeloblasts. A diagnosis of myelogenous leukemia was made. The patient went steadily downhill and died 2 months after admission.

CASE 2 C. McP., a 30-year-old man visited his physician for treatment of a badly infected mouth. The gums were bluish-black, and there was a foul exudate over the mucous membranes. The mouth under conservative treatment improved considerably. However the patient's general condition became worse and he developed generalized edema marked pallor weakness and fever. One month after the mouth lesion developed he was confined to bed. Blood studies made at this time showed a hemoglobin of 15 per cent (Sahli) a red-cell count of 1,550,000 and a white-cell count of 58,600. A differential count showed the cells to consist almost entirely of myelocytes and myeloblasts very few platelets were present. The red cells showed marked variations in size and shape, and many were nucleated. At this time the gums were very pale but were otherwise free of infection or bleeding. Throughout the illness there were no enlarged lymph nodes and neither the spleen nor the liver was palpable. One week after the blood study revealed the underlying disease the patient died.

As pointed out by Forkner³ and others gangrenous stomatitis is especially prone to occur in acute monocytic leukemia. Forkner states "In acute monocytic leukemia, diffuse swelling of the gingivae with a tendency for the teeth to become submerged in the gums is encountered in the

TABLE 1 Oral Lesions in Cases of Leukemia

| CASE No. | SEX | AGE | DIAGNOSIS | ORAL LESIONS |
|----------|-----|-----|-------------------------------|--|
| 1 | M | 23 | Subacute myelogenous leukemia | Gingivitis; bleeding from gums |
| 2 | M | 30 | Acute myelogenous leukemia | Ulcerath stomatitis |
| 3 | F | 58 | Acute monocytic leukemia | Ulcerath stomatitis |
| 4 | F | 50 | Acute monocytic leukemia | Ulcerath stomatitis |
| 5 | M | 39 | Acute myelogenous leukemia | Gingivitis; pain in jaw |
| 6 | F | 38 | Acute lymphatic leukemia | Pain in the jaw and bleeding from gums |
| 7 | M | 52 | Acute myelogenous leukemia | Bleeding from gums |
| 8 | M | 17 | Acute myelogenous leukemia | Bleeding from gums |
| 9 | F | 11 | Subacute myelogenous leukemia | Bleeding from gums |
| 10 | F | 5 | Acute lymphatic leukemia | No oral lesion |
| 11 | M | 15 | Acute myelogenous leukemia | No oral lesion |
| 12 | F | 62 | Acute monocytic leukemia | No oral lesion |

ing from the gums, the mechanism of which is not fully understood. Probably it is due in part to infiltration of the bone marrow by leukemic cells, which crowd out or inhibit the megakaryocytes with a resulting platelet deficiency. Subsequently secondary infection and ulceration may occur, or injudicious surgical procedure may result in necrosis and gangrenous stomatitis.

Infiltration of the gums by leukemic cells occurs in acute leukemia. This results in swollen gums, which are painful and bleed easily on slight trauma. At times this swelling is so extreme that the gums cover the teeth. Ulceration and necrosis occur very frequently.

In the series presented here (Table 1) the patients with leukemia had bleeding, pain or infection of the gums, with or without ulcerative stomatitis.

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great majority of cases." He believes that the oral lesions in acute lymphatic and acute myelogenous leukemia are usually nonspecific. Osgood⁵ reviewed cases of monocytic leukemia, and reported that gingival swelling was noted in 80 per cent of 88 cases in which the gums were mentioned. Not all investigators agree with Forkner that the infiltrative lesion is almost always pathognomonic of acute monocytic leukemia, but in general it is well recognized that gingival involvement is frequent in acute leukemia.

In the present series there were 3 cases of acute monocytic leukemia, and in 2 of them (Cases 3 and 4) extensive necrotic and ulcerative lesions developed from what at first appeared to be "trench mouth." The mere presence of Vincent's organisms and other secondary bacterial invaders should not lead to this diagnosis, as it implies a purely local process. In both cases mentioned, patients first visited the dentist, but the progressive character of the gingival lesions, with the rapid onset of pallor, fever and prostration, led to further investigation and the discovery of the background of acute leukemia.

Not infrequently cases have been reported illustrating the disastrous results of tooth extraction or other oral surgery. Recently Klumpp and Evans⁶ in a paper recording 8 cases of monocytic leukemia stated that 5 of these were discovered following extraction of teeth. In this regard the following 3 cases are of interest.

CASE 5 R. P., a 39-year-old man, visited a dentist because of pyorrhea, bleeding gums and pain in the lower jaw. His lower incisors and bicusps were removed, and 1 week later he was admitted to the Carney Hospital with extensive gangrene of the mouth. The hemoglobin was 48 per cent (Sahli), the red-cell count 2,600,000 and the white-cell count 69,000. The stained smear showed cells which appeared to be stem cells of the myeloid group. The patient died 48 hours after admission. Autopsy confirmed the diagnosis of acute myelogenous leukemia.

CASE 6 C. D., a 38-year-old woman, went to the dentist because of pain in the jaw. No local lesions which would account for this pain were found, but the patient insisted that the teeth be removed. Subsequent to the extraction she bled profusely from the sockets and then developed generalized oozing from the gums. Because of weakness, fever and severe epistaxis she entered St. Elizabeth's Hospital several weeks later. The laboratory findings were as follows: hemoglobin 20 per cent (Sahli), red-cell count 1,400,000 and white-cell count 1200. The stained smear showed markedly reduced platelets with white cells which were entirely of the lymphocyte group. Most of these were adult lymphocytes, but several lymphoblasts were found, and a diagnosis of acute lymphatic leukemia was made. Bone marrow biopsy substantiated this diagnosis, and soon afterward the patient died.

CASE 7 S. K., a 52-year-old man, had a molar extracted from his upper jaw and developed pain and bleeding at the site of extraction. The gum failed to heal, and he developed weakness, general malaise and aching pains in

the gums. When admitted to the Somerville Hospital 1 month later he had diffuse ulceration and pyorrhea of the gums, with necrotic material in the unhealed socket. Otherwise the physical examination was essentially negative. The laboratory findings were as follows: hemoglobin 38 per cent (Sahli), red-cell count 1,820,000 and white-cell count 2750. The stained smear showed 2 per cent adult polymorphonuclear leukocytes, the remainder of the cells looked like large lymphocytes, but an oxidase stain identified them as promyelocytes, and bone marrow biopsy substantiated the clinical diagnosis of myelogenous leukemia. This patient left the hospital. He died about six months later.

In the remaining 5 cases there was bleeding from the gums in 2 (Cases 8 and 9), and no oral lesions in the other 3. In Case 8 retinal hemorrhage with blindness was the initial and outstanding manifestation, although severe bleeding from the gums also occurred early in the course of the disease. Jaundice, enlarged liver and spleen and an aleukemic blood picture featured the course of Case 9. The patient developed bleeding from the gums, but this disappeared with the jaundice. For several months she was practically free of symptoms, but she finally succumbed after developing a blood picture typical of myelogenous leukemia.

DISCUSSION

Physicians and dentists should be encouraged not to regard the oral cavity as an entity, but rather to consider that the mouth has often the same relation to the body as have the eyegrounds, and frequently will be found to reflect underlying systemic disorders. Whenever they are confronted with apparently benign bleeding or gingivitis they should not fail to inquire into all the possibilities. Locally, pallor, ulceration and petechial hemorrhages of the mucous membranes, tonsillar enlargement and the presence or absence of glandular swelling in the neck should be noted. The prognosis should be guarded when there is severe stomatitis, especially in a patient with fever, pallor and dependent edema.

Acute leukemia is not a common disorder, and there are many diseases that may have oral manifestations of a similar type. In many cases a diagnosis by local investigation alone is impossible. Severe sepsis, agranulocytosis, infectious mononucleosis, essential purpura, hemophilia, scurvy, aplastic or myelophthytic anemias and rarely pernicious anemia may give rise to serious diagnostic difficulties, especially in the differentiation from aleukemic and leukopenic leukemias. Both the clinical course and routine blood studies in these atypical leukemias may be misleading, in any event the patient must be given the benefit of the doubt, and specific therapy, when possible, administered as early as compatible with good clinical judgment. On the other hand, indiscriminate

therapy before a diagnosis has been established should be deplored. Every reasonable clinical and laboratory test necessary for diagnosis should be applied before blood transfusion, Pentnucleotide, liver extract and chemotherapy have so confused the situation that a true picture of the case is impossible.

CONCLUSIONS

Oral lesions are frequent in acute leukemia, and are prone to occur early in the course of the disease.

Accurate diagnosis is important, in order that those conditions which simulate certain types of

leukemia may be differentiated and early therapy be instituted

It is evident that acute leukemia is an invariably fatal disease, but palliative measures and the avoidance of injudicious oral surgery will make the sufferer much more comfortable

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ONE-STAGE LOBECTOMY IN BRONCHIECTASIS*

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THE historical aspect of the development of pneumonectomy and lobectomy in man has been presented by numerous authors, notably Balloon, Singer and Graham,¹ Haight² and Heuer.³ Dissatisfaction with the one stage lobectomy for bronchiectasis early in the century was materially lessened by the development of the multiple stage attack, together with the perfection of anesthesia, the employment of new diagnostic methods and the better understanding of thoracic physiology. All these improvements rendered more feasible the approach to the ideal operation, namely a reasonably safe one stage procedure. A turning point in this direction came with the work of Brunn,⁴ published in 1929, at which time he reported 6 one-stage lobectomies with 1 death. In 1933 Alexander⁵ presented a two-stage procedure with a mortality below 20 per cent. The first stage consisted of creating adhesions between the healthy lobes and the chest wall so as to reduce the size of the pleural cavity and stabilize the mediastinum. In a review published in 1934, Heuer⁶ stated that the two-stage procedure still had the lowest individual mortality, although he predicted that the one-stage operation would become more frequent. Churchill⁷ in 1936 reported a mortality of 6 per cent in 49 cases covering the years 1929 to 1935. In 18 cases the one stage procedure was employed. At present it is probably true that most surgeons prefer the one stage method, but reserve the multiple stage attack for certain cases.

This article reports 5 cases of unilobar bronchiectasis in which lobectomy was performed in one stage. These cases represent all the one stage lobectomies performed at the Hitchcock Clinic for simple unilobar bronchiectasis, and in this group there has been no mortality. Lobectomy in cases with bilateral disease, tumor and tuberculosis is not considered at this time.

All cases were fully investigated for the presence of tuberculosis. Particular attention was paid to even moderate degrees of secondary anemia, which was present in 3 cases. All patients were bronchoscoped prior to operation. Postural drainage was instituted routinely, and close supervision was given in order to ensure favorable results. Adequate time was allowed to get the patient in the best possible condition for operation.

Intravenous saline and glucose were started just before operation by tying a cannula in an ankle vein. Avertin was administered on the 80-mg scale, and nitrous oxide and ether were introduced through the Flagg type of intratracheal tube. In the lower lobe cases the seventh rib was resected in the posterolateral aspect. In the upper lobe case the incision was made through the bed of the sixth rib. The Bethune modification of the Shenn stone tourniquet was employed at the hilus. Closure of the hilar stump was obtained by mattress sutures of catgut.

Drainage was employed in 4 cases. In Case 2 (upper lobe) no drainage was employed, and empyema resulted. In 3 cases drainage was done by means of a No. 24 urethral catheter inserted posteriorly just above the diaphragm, moderate

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suction being applied at the bedside. In Cases 4 and 5, in addition to the posterior catheter, a Pezzar catheter was inserted anteriorly, and 6 to 8 cm of water suction was applied to both tubes. Re-expansion of the lung was greatly facilitated by this procedure. In these 2 cases bronchoscopic aspiration of the tracheobronchial tree was carried out immediately at the close of the operation. It resulted in marked improvement in the oxygenization and comfort of the patient in the first postoperative hours. All 5 patients were given a transfusion of citrated blood during or immediately after operation. The oxygen tent was employed routinely, but only for a few hours in Cases 4 and 5.

In Case 1, mild hemoptysis occurred a year after lobectomy. This was successfully treated by bronchoscopic cauterization of the left lower lobe stump. There has been no recurrence in two years. In Case 2, a hemolytic streptococcus empyema occurred, which was successfully treated with Pron-tosil. However the cavity left by lobectomy failed to close, and the empyema recurred a year after operation. This was treated by thoracostomy, followed by a regional thoracoplasty for closure of the cavity. There has been no further trouble in a year and a half. In Case 3, a mild wound infection developed but cleared promptly with drainage. In Cases 4 and 5 there were no complications.

All the patients were free of cough and sputum and were able to carry on their normal occupations. In Case 1 a postoperative Lipiodol injection showed a slight saccular end of the bronchial stump at the point of amputation. The patient was entirely well, however, and has been through two winters without trouble.

CASE REPORTS

CASE 1 C M, a 32-year-old, married woman, was admitted July 15, 1936. Except for an attack of pneumonia in childhood, she had been in perfect health until 3 years before admission, when she had a small hemoptysis. At that time the hemorrhage was considered to have come from the nose or throat, and although the lungs were examined with a stethoscope no x-ray film was taken, and the patient was considered well. One year before admission, while sitting quietly in a chair, she had a second hemoptysis of a mouthful of blood. An x-ray film was negative, and a tuberculin test also was negative. Repeated sputum examinations failed to show tubercle bacilli. Five weeks before admission she had a severe pulmonary hemorrhage, the blood spurting from her mouth, and she lost nearly a quart of blood. Again sputum examination and a tuberculin test failed to indicate any disease process.

Physical examination on admission showed a rather pale, sallow, undernourished woman in a nervous condition. The entire examination was negative. The red-cell count was 3,700,000, and the white-cell count 5800. Urinalysis

was negative, and sputum tests for tuberculosis also were negative. Plain x-ray films of the chest were negative, except for an old healed tuberculous infection of the right hilus nodes. Bronchoscopic examination was negative. Lipiodol injection showed bronchiectasis of the medial bronchi of the left lower lobe, with some atelectasis and failure of alveolar filling (Fig 1).

On July 30, under intratracheal anesthesia, a posterolateral incision was made, and it was found that the lower lobe was densely adherent to the diaphragm by vascular adhesions. There was an incomplete separation between the upper and lower lobes, so that the tourniquet was applied to the lower lobe and the base of the upper. The stump of the lower lobe was secured with mattress sutures. There were no adhesions between the upper lobe and the chest wall. A No. 24 urethral catheter was



FIGURE 1 Case 1
Atrophic bronchiectasis of the left lower lobe, with atelectasis

inserted through a trocar wound in the posterolateral aspect of the chest just above the diaphragm, and the wound was closed in layers. Moderate suction was placed on the catheter as soon as the patient had been returned to the ward. The pathological diagnosis was atrophic bronchiectasis and chronic pneumonitis.

In the first 48 hours after operation some difficulty in raising sputum was encountered, but this was lessened by postural drainage, the patient coughed up some blood-streaked mucus. The drainage tube was removed on the 8th postoperative day. The temperature rose as high as 101°F on each of the first 5 postoperative days. It then gradually declined to normal. The patient was discharged on the 27th postoperative day. An x-ray film taken at discharge showed that the left lung was completely expanded. The lung fields were clear except for the remains of Lipiodol at the right base. The heart was displaced slightly to the left.

On December 28, 1937, the patient had another small hemoptysis. She was readmitted to the hospital, and bronchoscopic examination showed an area of granulation tissue in the bronchial stump of the left lower lobe. This was cauterized, and for the last 2 years the patient has

been perfectly well and has gained weight. She has had no cough or sputum and no complaints.

Case 2. R. L., an 18-year-old girl, was admitted on January 25, 1937 complaining of persistent cough productive of foul smelling sputum, amounting sometimes to 100 or 150 cc. a day. She had had several attacks of pneumonia in childhood each one leaving her with more cough. Five years before admission the sputum increased in amount and became foul-smelling. There was an occasional frank hemoptysis. The patient could not take part



FIGURE 2. Case 2

Appearance of the cyst on admission to the hospital. Note the fluid level and the small amount of Lipiodol in bottom of the cyst.

in social activities because of the frequency of the cough and the foulness of the sputum. Routine x-ray films taken at school 1 month before admission showed a lesion in the right upper chest. The patient was sent to another hospital, where a Lipiodol injection was done. Following this examination she became very ill, with fever, sweat, and weight loss. The sputum increased to 250 or 300 cc. a day and she was unable to lie down for fear of choking.

Physical examination showed a sallow-complexioned girl, fairly well nourished and not acutely ill. There was a frequent cough productive of foul sputum. The patient was unable to lie flat in bed because of the cough. Examination of the chest revealed impaired resonance and decreased aeration of the right upper lobe. There was marked clubbing of the fingers. The temperature was 99.8 F. The red-cell count was 4,310,000 and the hemoglobin 13 gm. There were 12,500 white cells, with 57 per cent polymorphonuclears and 27 per cent lymphocytes. The urine showed 0.007 gm. of albumin; otherwise the examination was negative. Examination of the sputum showed no spirochetes, a few pneumococci and numerous streptococci. Repeated examinations failed to show tubercle bacilli. An x-ray film of the chest showed a large, round cavity 8 cm. in diameter in the mid-portion of the right lung (Fig. 2). The cavity was half filled with fluid, with a small amount of Lipiodol at the bottom.

The wall was extremely thin and there was no reaction in the surrounding lung. The medial wall of the cavity was in contact with the mediastinum; in the lateral view the anterior wall was in contact with the anterior wall of the chest, the loculation being in the lower portion of the upper lobe. The lung fields were otherwise clear. The x-ray diagnosis was congenital lung cyst with bronchial communication. The patient improved remarkably on postural drainage. She received three injections of neoarsphenamine. On February 28 days after admission an x-ray film showed that the upper lobe cyst had been emptied of its contents. The temperature at this time was normal and lobectomy was advised.

The right upper lobe was removed on February 16. A posterolateral incision was made, with resection of the sixth rib. The pleural space over the upper lobe was completely obliterated by rather dense adhesions, some of which were quite vascular. The lower and middle lobes were also adherent to the chest wall. A segment of the seventh rib was also resected to improve the exposure, and the lobe was dissected away from the chest wall and mediastinum. It was seen that the cyst in the anterior surface of the upper lobe was provided with a separate



FIGURE 3. Case 2.

Surgical specimen showing the cyst and the atelectatic upper lobe.

bronchus arising from the right upper lobe bronchus. Tourniquets were placed about the hilus of the latter and the lobe was amputated. The stump was secured with mattress sutures, and the chest was closed without drainage (Fig. 3). The pathological diagnosis was bronchial cyst, congenital. It is possible that the cyst could have been dissected away without complete removal of the lobe, but it was thought to be too deeply imbedded.

The patient reacted very well after the operation. The

temperature rose to 101°F the next day, and on the following day to 102. Thoracentesis on the 7th day yielded fluid which gave a pure culture of hemolytic streptococci. The infection was treated by injecting Protosil into the cavity and also intramuscularly. On the 21st postoperative day the chest fluid was sterile, and from then on the course was one of rapid improvement, the temperature returning to normal. The patient was discharged on the 33rd postoperative day, at which time she had no cough or sputum. It was noteworthy, however, that the mid-

of 5 she had a second attack of pneumonia, following which the sputum gradually increased. There were several other attacks of pneumonia, the last occurring in March, 1937. The patient was practically never without a "cold." Her general health was good. She was able to enjoy mild exercise and gained steadily in general development.

Physical examination showed a well developed and nourished girl in no acute distress. The only positive findings were in the thorax, where the expansion of the left chest was greatly reduced and that of the right was exaggerated. Tactile fremitus and whispered voice were markedly increased over the left base posteriorly, and there were scattered moist rales over this area. There was structural scoliosis with convexity to the right. The red cells numbered 4,120,000 and the white cells 8300, the hemoglobin was 13.5 gm. X ray examination showed the left side of the thorax to be considerably smaller than the right, with corresponding scoliosis of the thoracic spine. The entire lower half of the left lung field was obscured by homogeneous density. The upper portion of the lung appeared clear. The appearance was that of atelectasis of the left lower lobe. Lipiodol injection showed that there was a marked saccular bronchiectasis involving the entire left lower lobe, with marked atelectasis in this region.

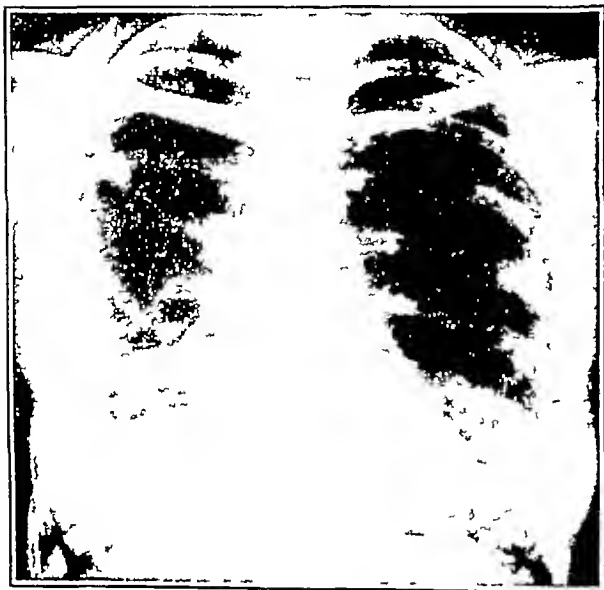


FIGURE 4 Case 2

Cavity left after lobectomy due to failure of the lower and middle lobes to overexpand

dle and lower lobes never overexpanded so as to occupy the space created by removal of the upper lobe (Fig 4).

The patient remained well through the next year, without cough or sputum. She was readmitted, however, on January 22, 1938, with fever and pain in the right chest. The temperature rose to 104°F each day, and the patient was obviously toxic. X ray examination showed an accumulation of fluid in the space previously occupied by the upper lobe. The red-cell count was 4,000,000, and the white-cell count 11,700. Thoracentesis in this region resulted in the recovery of thick, green pus, which on culture showed non hemolytic streptococci and pneumococci. Blood culture was sterile. It was considered that the bronchial stump must have opened and that the pleural cavity had become contaminated through this avenue. An incision at the anterior edge of the old lobectomy scar was made, and large quantities of pus were evacuated. The temperature immediately dropped to normal and remained there, and 21 days later a thoracoplasty was performed with resection of the first five ribs. The patient recovered rapidly from this procedure, obtained a good collapse of the cavity and returned home 16 days after the last operation. She has remained well during the year and a half following the last operation.

CASE 3 A. L., a 15-year-old girl, was admitted August 25, 1937. She gave a history of always having had "chest trouble." Since an attack of pneumonia at the age of 2 she had had a chronic cough with production of about 30 cc. of thick, yellow sputum a day. At the age



FIGURE 5 Case 3

Advanced saccular bronchiectasis of the left lower lobe, with atelectasis of the lobe and compensatory changes in the right lung. The scoliosis was probably due to atelectasis with pleural adhesions.

There was overexpansion of the right lung field, which extended a third of the way into the left thorax. This was considered to be a typical surgical case (Fig 5).

Lobectomy of the left lower lobe was performed on November 10. The usual posterolateral incision was made. The left lower lobe was found to be dark red, firm and atelectatic. It was densely adherent to the chest wall, diaphragm and upper lobe. The base of the upper lobe was adherent to the chest wall. After lobectomy in the usual manner a No. 24 urethral catheter was inserted just above the diaphragm in the posterolateral aspect of the chest.

The pathological diagnosis was hypertrophic bronchiectasis, with marked chronic interstitial pneumonitis and fibrosis.

Immediately after the operation the patient ran a fever which reached 102 F on the 3rd day. This was found to be due to a wound infection and when the latter was drained the temperature returned abruptly to normal. Convalescence was uneventful. The patient was discharged on the 39th postoperative day without cough or sputum.

The patient has been seen repeatedly in the follow-up clinic and has remained well. She goes through the winter with one cold and has no cough or sputum. There is considerable shift of the heart to the left, occupying the region of the lower lobe. The scoliosis is not improved.

Case 4 E. T., a 31 year-old woman was admitted July 10, 1938. She had had eight hospital admissions elsewhere, mostly for pelvic operations. In 1933 she was badly



FIGURE 6. Case 4

Moderate saccular bronchiectasis of the right lower lobe

injured in an automobile accident, and was unconscious for several days. Her chief complaint at the time of admission was a productive cough since February 1937 with frequent hemoptysis. There was frequent joint pain and weakness and fatigue during this time.

Physical examination was essentially negative, except for reduced aeration of the right lower lobe with occasional rales. The red-cell count was 4,900,000 and the white-cell count 6000. The hemoglobin was 16 gm. Repeated examination of the sputum was negative for tubercle bacilli. A tuberculin test was negative. At x-ray examination the lung markings at the right base were increased in width and density. In the lateral view these markings lay in the region of the lower lobe. Otherwise the lung fields were clear. Lipiodol injection showed saccular bronchiectasis of the lower lobe bronchi associated with failure of alveolar filling (Fig. 6). The rest of the bronchi were normal. The patient returned home for some days and was readmitted on August 15.

At operation September 26 the lower lobe of the right lung was found densely adherent to the lateral chest wall. The base of the upper lobe was also connected to the chest wall by a few delicate strands. The fissure between the

lobes was incomplete. The lower lobe was amputated in the usual manner. For drainage a No. 24 urethral catheter was inserted posteriorly and a No. 24 Pezzer catheter anteriorly. After closure of the chest, suction was placed on both catheters. At the end of the operation a bronchoscope was passed and the tracheobronchial tree was cleaned of secretions. The pathological diagnosis was chronic bronchiectasis.

The patient had an entirely uneventful postoperative course. The temperature reached 101 F on the 3rd postoperative day but rapidly declined to normal thereafter. X-ray examination of the chest the day after operation showed the right lung nearly completely expanded and practically no fluid present in the pleural cavity. The patient was sent home on the 21st postoperative day having gained 4 pounds in the first 2 weeks following operation.

The patient has been free of cough and sputum, although she has had complaints referable to other parts of the body.

Case 5 L. F., a 26-year-old man was admitted May 1 1939. He had had pneumonia at the ages of 15 16 and 17. Five years previously he had developed a productive cough which had been present ever since. He raised



FIGURE 7. Case 5

Moderate bronchiectasis of the right lower lobe

large quantities of foul sputum and was practically never without a "cold."

Physical examination was essentially negative except for decreased aeration and scattered rales over the right lower lobe. The red-cell count was 4,650,000 and the white-cell count 17,050. Urinalysis was negative. Repeated examinations of sputum were negative for tubercle bacilli. Serological tests were negative. X-ray examination showed an increased density of the lower portion of the right hilus and of the lung markings running to the cardiophrenic angle. Otherwise the chest was negative. The appearance was that of an infection at the right base. Lipiodol injection showed a moderate saccular bronchiectasis of the

terminal bronchi of the right lower lobe posteriorly, with failure of alveolar filling and some evidence of atelectasis (Fig 7)

At operation on May 3, no adhesions were encountered in the right thorax. After sectioning the inferior pulmonary ligament the lower lobe was amputated between tourniquets, and the stump was closed in the usual manner. A urethral catheter was inserted posteriorly and a Pezzer catheter anteriorly as in Case 4, and at the termination of the operation bronchoscopic aspiration of the tracheobronchial tree was carried out. The pathological diagnosis was bronchiectasis, with chronic suppurative pneumonitis and organized pneumonia.

The patient had a completely uneventful recovery. The temperature rose as high as 101°F on the 2nd postoperative day, but rapidly declined to normal. He was allowed to get up on the 11th day and was discharged on the 18th day after operation.

The patient has remained free of cough and sputum, has gained weight, and is back at his work as a car salesman.

CONCLUSIONS

I believe that one-stage lobectomy is the procedure of choice in the treatment of bronchiectasis, and that with present-day methods it is reasonably safe. Multiple-stage operations should be applied to cases in which the patient is in poor general condition, or in which technical difficulties are expected in the presence of unusually extensive adhesions, so that the possibility of hemorrhage and manipulation may result in a prolonged and dangerous operative procedure.

SUMMARY

Five cases of unilobar bronchiectasis are presented in which one-stage lobectomy was successfully performed. This represents the total experience at the Hitchcock Clinic with the one-stage operation for simple bronchiectasis of a single lobe. Preoperative measures, operative technic, complications and results are discussed.

It is pointed out that in 1 case there were very few adhesions between the normal lobe and the chest, and in 2 cases there were no adhesions. None of these 3 patients developed empyema, and in all, re-expansion of the lung was prompt.

The average postoperative hospitalization was twenty-seven days, the longest period being thirty-nine and the shortest eighteen.

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DISCUSSION

DR. THOMAS H. LANMAN, Boston: I agree with Dr. Tyson. He believes, as we do at the Children's Hospital, that it is very much safer to drain all these cases. All our 14 patients have had the one stage operation that he advocates, and we have had the good fortune not to lose any. It is interesting that the histories of most of his patients suggest that the onset of the bronchiectasis dates back to childhood.

DR. HARLAN F. NEWTON, Boston: I agree with Dr. Lanman. In our series of lobectomies for chronic bronchiectasis at the Peter Bent Brigham Hospital, all these patients have been operated on by a one stage procedure, which Dr. Tyson also used. Certainly it is now well established that in experienced hands it is possible to remove a lobe of a lung with a low operative mortality.

There are two points I should like to add which I know Dr. Tyson did not have time to elaborate on. In the first place, the great majority of my cases of chronic bronchiectasis involving the lower lobe of the lung treated by lobectomy have shown involvement of the lingula of the upper lobe, particularly if the interlobar fissure between the lobes is obliterated. Because of this it is my routine practice to remove the lingula of the upper lobe in a so-called lobectomy for lower lobe bronchiectasis, hence the operation should perhaps be called partial pneumonectomy rather than lobectomy.

The second point of interest is that, with the cause of bronchiectasis often obscure, removal of a definitely diseased lobe of the lung does not in every case ensure against recurrent bronchiectasis in the opposite lung. I have just seen such a patient, on whom I performed left lower lobe lobectomy at the age of seventeen, four years ago, and who at that time showed, by bronchoscopy, Lipiodol studies and other examinations, disease limited to the left lower lobe. She has also had no demonstrable sinusitis or chronic upper respiratory infection. She now has definite tubular bronchiectasis of the right lower lobe.

I believe, therefore, that the problem is at present not so much the technical one of safely removing a portion of the lung for chronic infection,—for that has been demonstrated,—as it is a pathological one as to the origin of the primary disease and the prevention of its recurrence.

DR. TYSON (closing): Regarding lingula involvement we looked for this very carefully in our cases and were unable to demonstrate any disease in this area. Bronchiectasis that has been overlooked in the lingula and not treated will almost surely give rise to residual symptoms. If involvement of the lingula is present, this portion of the lung should be removed.

I wish to emphasize again that we found the use of two drainage catheters of the greatest help in the last two cases. I first saw Dr. Churchill use this method of facilitating re-expansion and drainage. Postoperative bronchoscopic aspiration, performed as soon as the intratracheal tube has been removed, is also of great assistance in promoting the comfort and oxygenization of the patient in the first twenty-four hours. This practice was suggested to me by Dr. Lindskog, of New Haven.

I do not believe that the reappearance of bronchiectasis after the removal of a diseased lobe is adequately provided, at least in any significant number of cases. I am inclined to think that if it is discovered subsequent to operation, the Lipiodol injection made before lobectomy may have been at fault.

REPORT ON MEDICAL PROGRESS

RECENT ADVANCES IN THE BIOCHEMISTRY AND THERAPEUSIS
OF POTASSIUM SALTS*

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POTASSIUM salts have been employed in the treatment of disease for many centuries. It seems reasonable to believe that in most cases the indications for their use were based on practical experience and were not derived by rational deductions from experimental observations. Recent investigations have enlarged our knowledge of the action of potassium salts, and at present, indications for their use are more precise and less empirical. In this review no attempt will be made to discuss all the recent data concerning the role of potassium in the animal and human organism. Only certain evidence believed to be related to the argument will be presented.

THEORETICAL AND BIOCHEMICAL CONSIDERATIONS

The inorganic salts of potassium are highly ionized in the body. Little attention need be given, therefore, to the anion, the principal effects of the presence of potassium will be assumed to be produced by the cation. There is no recognized hormone in the body that regulates potassium exchange or desoxycorticosterone regulates sodium exchange or parathormone regulates calcium exchange. It is likely that at some future time a hormone or regulator for potassium will be discovered, the lack of recognition of which offers a formidable check on pertinent investigations.

There are three known isotopes of potassium, having atomic weights of 39, 40 and 41. More than 93 per cent of the potassium in animal tissue has an atomic weight of 39¹; nearly all the remainder consisting of that with an atomic weight of 41. The isotope with the atomic weight of 40 is responsible for all or nearly all the radioactivity of potassium. It is extremely rare, and does not appear to be more concentrated in animal tissue than elsewhere in nature. No effects of naturally occurring potassium can be attributed with certainty to its radioactivity, nor have any biologic

effects been observed experimentally from irradiated potassium salts that were unlike natural potassium.²

Of the several satisfactory methods for the determination of serum potassium, we believe that the one revised in our laboratory³ possesses certain advantages. The range for serum potassium in healthy men is between 3.5 and 4.5 milliequiv per liter (14 to 18 mg per 100 cc.) in 90 per cent of the subjects, the extreme range is from 3.4 to 4.9 milliequiv per liter.

In this presentation the role of potassium will be discussed under three divisions: as the principal base in tissues and blood cells it is concerned with the regulation of acid base balance of the body, as an insulin antagonistic and epinephrine like substance, it participates in the intermediary metabolism of carbohydrates, as an antagonist of cholinesterase and as the principal base in muscle cells, it is concerned with the transmission of the nerve impulse to the muscle fiber and with the contractility of muscle. While we do not wish to engage in polemics concerning the chemical versus the electrical theory of conduction of the nerve impulse it appears to us that the chemical theory best explains most experimental observations.

The recognition of the participation of potassium in neuromuscular physiology is recent. To be sure, Ringer,⁴ Howell⁵ and others showed that large amounts of potassium in perfusion fluid exert an effect on cardiac action, but only in the last decade have investigations produced data of interest to clinicians. Brown and Feldberg⁶ showed that small concentrations of potassium chloride in perfusion fluid increase the response of sympathetic ganglia to single submaximal preganglionic volleys. They observed also that potassium stimulates the cells of normal and denervated ganglia to discharge. Conversely, Vogt⁷ showed that in the dog, prolonged faradic stimulation of the preganglionic fibers of the superior cervical ganglia produced a decrease in potassium content of the ganglionic tissue. At the motor end-plates potassium has an action antagonistic to that of curare,⁸ and in this action it is similar to prostigmine,⁹ guanidine, ephedrine and Congo red. This suggests that

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†Paper No. 9 in Studies on Myasthenia Gravis, prepared by one of the authors (R. S. S.).

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potassium has an inhibiting effect on the action of cholin esterase. Lastly, Fenn¹⁰ has shown that during muscular contraction potassium leaves the muscle and that not until recovery does it return. These and other significant investigations constitute advances in the clinician's understanding of disease.

In an attempt to simplify this presentation, it has been assumed that the several actions of potassium are independent, although it is likely that subsequent observations will not bear this out. For example, in Addison's disease the action of potassium may not be confined to any one of the three pharmacologic effects, and in the treatment of hay fever the epinephrine-like action may be associated with a change in acid-base balance or in neuromuscular function. It is quite possible that we are misinterpreting some of the actions of potassium, but for the sake of clarity they will be discussed separately and in the order given above.

THERAPEUTIC CONSIDERATIONS

Potassium salts may be prescribed in various forms for oral administration. It is our experience that an aqueous solution of potassium chloride produces less gastrointestinal distress than does the administration of the salt in gelatin capsules or in tablet form. Usually a 25 per cent solution of potassium chloride is prescribed, one teaspoonful of which contains approximately 1 gm of the salt. The quantity to be ingested is therefore easy to calculate. One teaspoonful may be added to a wine-glassful of water, milk, fruit or tomato juice and ingested with little or no gastric distress. Occasionally patients complain that they have been unable to tolerate initial daily doses totaling 6 or 8 gm of potassium chloride. Under such circumstances smaller doses are given at first and the amount is increased daily up to the maximum desired. Those who have been instructed in this manner have been able to take the quantity prescribed without untoward effects. A more detailed description of potassium administration in patients with myasthenia gravis is given below.

Edema

An accumulation of sodium chloride and water in the interstitial spaces is the invariable state in edema, whether this arises from renal, cardiac or hepatic failure. If a hypertonic solution of potassium chloride is given, a two-fold action results. Potassium competes with sodium for body water, and if an adequate amount is not available for both, a portion of the retained sodium is displaced and subsequently excreted in the urine. Secondly, potassium competes with sodium for reabsorption

by the cells of the renal tubules, so that if a large excess of potassium is present in the glomerular filtrate, it depresses the sodium reabsorption and an additional loss into the bladder urine ensues.

In the treatment of edema, Barker¹¹ found that 5 gm of potassium chloride was an effective diuretic. Keith and Binger¹² confirmed this observation in patients and observed, in addition, a diuretic action in normal persons. Mackay and Butler,¹³ however, were unable to detect any significant increase in excretion of sodium or edema fluid following the ingestion of equal amounts of potassium chloride. There is no satisfactory explanation for this failure of agreement among the various experimental observations.

Addison's Disease

The data on patients with Addison's disease appear to be more definitive. This malady is caused in part by a failure in elaboration of one or more hormones of the adrenal cortex, and involves dissipation of sodium and water and retention of potassium and urea. Some authorities hold that the increased concentration of potassium is as important in the pathogenesis of certain symptoms as is the decrease in concentration of sodium. It follows that a high potassium intake may aggravate symptoms of adrenal insufficiency, conversely, a low potassium intake may be beneficial in the treatment of this condition. A practical test, based on this observation, has been devised by Wilder and associates¹⁴ for suspected adrenal insufficiency. Five gm of potassium citrate is given daily for approximately three days. The patient, meanwhile, is given a diet low in sodium content. A decrease in concentration of serum sodium, an increase in output of sodium in the urine and symptoms of adrenal insufficiency follow if the presumptive diagnosis is correct. In the treatment of Addison's disease a low potassium intake (less than 2 gm per day) has been recommended, although we have been unable to confirm its reported merits in the series of cases in which we are interested.

Recently, an entirely new concept of the value of potassium in Addison's disease has been proposed. If desoxycorticosterone acetate, a synthetic sterol similar to the sterols isolated from the adrenal cortex and useful in the treatment of Addison's disease, is given in excessive amounts it produces an increase in concentration of serum sodium, a decrease in concentration of serum potassium¹⁵ and an exacerbation of malaise, weakness and gastrointestinal symptoms. The effects from over-treatment of patients with Addison's disease are analogous to those of patients with diabetes mellitus who have received an unnecessarily large amount of insulin. Following the assimilation of excessive

quantities of desoxycorticosterone acetate, the level of serum potassium in Addison's disease may decrease to as low as 2.5 milliequiv per liter. Generalized paralysis of the skeletal musculature may occur, as in periodic paralysis (see below), at this level of serum potassium. For the sake of clarity, it may be reiterated that a high potassium intake is harmful in adrenal insufficiency, but beneficial in patients who have been given inadvertently an excess of the active material during treatment.

Obesity

The use of potassium salts in the treatment of obesity has been recommended by Rusk.¹⁴ It was his experience that a high protein intake supplemented by 4 gm or more of potassium chloride daily constituted an effective anti-obesity regimen. Undoubtedly the initial loss of weight was associated with the diuretic action of potassium salts. After this effect has passed restriction of caloric intake seems most essential.

Diabetes Mellitus

There are several reports that potassium is associated with assimilation and utilization of carbohydrates in the body. McQuarrie and his associates¹⁷ observed in 4 diabetic children a decreased tolerance to glucose following the ingestion of 12 to 35 gm of potassium chloride. Gellhorn and Skupa¹⁸ demonstrated that the rate of absorption of glucose from the intestines of frogs is increased by the presence of potassium chloride. Silvette and Britton noted a loss of glycogen from the liver¹⁹ and from the skeletal and heart muscle²⁰ and an increase of blood sugar following the intraperitoneal injection of potassium acetate. Furthermore, it has been known for more than a decade that a decrease of serum potassium is associated with symptoms of insulin shock. Lastly, in a susceptible person, either an injection of insulin or a high-carbohydrate meal may induce an attack of periodic paralysis with decrease of serum potassium. It may be concluded from these data that potassium has a biological action antagonistic to that of insulin. Clinically, little advantage has been taken of this effect, although McQuarrie et al. have shown that insulin hypoglycemia in diabetes mellitus may be controlled partially with potassium chloride. Further trial of potassium salts in persons difficult to regulate with insulin seems indicated.

Allergic Diseases

Another action of potassium which in many respects is opposite to that mentioned above is its epinephrine-like effect. This has been utilized in the treatment of allergic diseases. Bloom²¹ reported beneficial effects in 29 patients with hay fever using

1 or 2 gm of potassium chloride daily. Many were improved within twenty-four hours, and a few more were improved or completely relieved of symptoms within three days. Bloom recommends daily ingestion of potassium during the entire hay fever season. Cessation of ingestion may be followed by exacerbations of symptoms. Rackemann²² has been unable to confirm these findings using similar quantities. He has not abandoned the use of potassium salts, however, and believes that further clinical trial is indicated before making a final commitment. Patients with bronchial asthma do not benefit from potassium chloride so consistently as do those with uncomplicated hay fever.²³

A discussion of urticaria concludes the allergic manifestations. Rusk and Kenamore²⁴ treated 6 patients suffering from this disease with an acid ash diet, high in protein (which is also high in potassium) and low in sodium. In addition, from 4 to 6 gm of potassium chloride was prescribed daily. All the patients responded to this treatment. Subsequently, a group of 20 patients were treated with similar results. These observations could not be confirmed in 8 patients by Cohen.²⁵

Acid-base studies in allergic diseases are few in number, and those which are reported are not complete. Rusk and his associates²⁶ observed a slight increase above normal in concentrations of serum potassium during exacerbations of bronchial asthma. Clinical improvement was accompanied by a decrease in concentration. At no time was the average range for serum potassium in allergic patients as low as the average range for normals. These authors' interpretation of the higher potassium levels is similar to that advanced by us for Ménière's disease, namely, an elevation in the serum is indicative of a migration of this electrolyte from extravascular areas.

The hypothesis advanced by Bloom²¹ in explanation of the beneficial effect of potassium in allergic manifestations was that it participated as an electrolyte in the acid base balance of the blood. He assumed that the major disturbance was an altered electrolyte metabolism with involvement of the adrenal glands. This explanation is somewhat difficult to accept. One more acceptable to us is an action on the sympathetic synapses or neuromuscular junctions and restoration of vasomotor tone. This is consistent with the data and conclusions of Camp and Higgins.²⁶ A constriction of the bronchioles induced by histamine could be relieved as promptly and completely by potassium as by epinephrine. They conclude that one function of epinephrine is the maintenance of an optimum potassium level in the body and that changes in potassium are responsible for typical changes ascribed previously to epinephrine.

The objections raised by Engelsher²⁷ to the treatment of allergic diseases with potassium may be refuted in part. In a series of 64 patients with various allergic manifestations he noted epigastric pain and other intestinal disturbances in a majority. Such symptoms are more likely to develop within a day or two after beginning the regimen. Although he gave no data on the duration of treatment, it is reasonable to believe that his patients took potassium an insufficient length of time to warrant satisfactory conclusions.

Familial Periodic Paralysis

Familial periodic paralysis was one of the first neuromuscular disorders to be treated systematically with a high potassium intake.²⁸ This malady is characterized by spontaneous attacks of flaccid paralysis of the muscles of the extremities, with a concomitant decrease in serum potassium.²⁹ The concentration may be as low as 2.5 milliequiv per liter, a level that may also be reached during paralysis from overtreatment of Addison's disease with desoxycorticosterone acetate. Paralytic seizures have been induced in susceptible persons by injections of epinephrine and of insulin and by ingestion of a high-carbohydrate meal. Each of these procedures causes a diminution in concentration of serum potassium in normal as well as in afflicted persons. The daily ingestion of 2 to 5 gm of potassium chloride or potassium citrate appears to be effective in preventing paralytic episodes. A boy whom we have been following for more than two years has experienced a marked diminution in the number of attacks per year on such a regimen and is able to live a relatively normal life. The only time he suffers from paralytic attacks at present is after overindulgence in carbohydrates.

The pathogenesis of paralysis of the familial periodic type has not been defined. No change in cholin esterase activity of the serum has been demonstrated. The absolute level of serum potassium appears to be less of a factor in inducing an attack than is a diminution per se in concentration of this constituent. Controlled metabolic experiments have failed to demonstrate a loss of potassium from the body following water diuresis.³⁰ A migration of potassium from the serum into certain tissues prior to or during the paralytic stage undoubtedly occurs. It is suggested as a hypothesis that the migration is accompanied by a lowering of concentration of potassium in certain synapses of the central nervous system or at the neuromuscular junctions of affected muscles. The prevention and treatment of attacks by potassium ingestion lend weight to this hypothesis.

Myasthenia Gravis

Myasthenia gravis is another neuromuscular disorder which responds in a remarkable manner to the ingestion of potassium.³¹ The mechanism of weakness in this disorder is unknown, but it has been suggested that it is associated with an increase of cholin esterase activity at the neuromuscular junction and a diminution of available acetylcholine. Relief from symptoms of weakness is accompanied by restoration of the disordered equilibrium of the chemical mediators at this point.

Potassium chloride was first used in the Massachusetts General Hospital in the treatment of patients with myasthenia gravis in 1936. From 10 to 10 gm per day was prescribed in addition to prostigmine. Three patients, all severely afflicted, believed that they were improved on this regimen. If 5 gm of potassium chloride was taken simultaneously with 15 mg of prostigmine, the efficiency of prostigmine was increased and the effect was prolonged. No diminution in the amount of prostigmine required to control the patients' symptoms, however, was observed. In 1937 potassium chloride was recommended to 3 other patients with myasthenia gravis. Benefit was admitted by only one. The following year the use of potassium chloride was reinvestigated. At that time large amounts were given with striking benefit. The ingestion of 10 to 12 gm, three times a day, in 5 cases was followed by a significant reduction in the amount of prostigmine needed. In patients whose daily requirements were from twenty to thirty prostigmine tablets (15 mg each) by mouth, it was possible when in the hospital to reduce the number to two or three if large amounts of potassium salts were taken.* A reduction in the cost of treatment and an opportunity to maintain a more complete state of remission were achieved. Up to the present 24 patients have taken or are taking with benefit large amounts of potassium chloride and smaller amounts of prostigmine than formerly.³² In addition, 7 patients began the ingestion of potassium chloride but discontinued it subsequently, either because they were not helped or because of untoward symptoms. It appears to be impossible to regulate patients on potassium chloride alone. The failure of Minski³³ in the treatment of myasthenia patients with potassium chloride and prostigmine may be attributed to inadequate amounts used.

A satisfactory method for the ingestion of large amounts of potassium chloride embraces the use

*On the outside when one is dealing with patients who are of course much more active than a person in a hospital bed all day no such reduction in prostigmine occurred. In these cases the amount of prostigmine was reduced from twenty to fifteen tablets and in others from ten to six or approximately 20 to 40 per cent.

milk as a vehicle. We have recommended that patients prepare each day a mixture of the following

| | |
|--------------------|-------------------------|
| Milk | 1 quart |
| Cream | ½ cup |
| Egg | 1 |
| Sugar | 2 teaspoonfuls |
| Potassium chloride | 8 teaspoonfuls (30 gm.) |

The formula may be taken in three divided doses with regular meals. Other patients prefer a 25 per cent aqueous solution of potassium chloride flavored with a small amount of peppermint water. Thirty cubic centimeters of such a mixture may be taken three times a day with meals. Potassium chloride may be prescribed in 1-pound amounts of the dry crystals for the patient to prepare his own solution, or as the 25 per cent solution in large quantities.

Recently it has been observed that a combination of guanidine hydrochloride (0.0125 gm.), potassium chloride (5-10 gm.) and prostigmine (15 mg) taken with meals gives a sustained effect for three or four hours. Only in most desperate cases is such a combination of anti myasthenia drugs necessary. It is to be noted that potassium chloride as well as prostigmine and guanidine are potent anti-curare substances.

Ménière's Disease

The history of the use of potassium chloride in the treatment of Ménière's disease or Ménière's symptom-complex seems worth relating. Several years ago Mygind and Dederind³¹ assumed that this malady was associated with a disturbance of water and salt metabolism. A waterlogged labyrinth was thought to be at fault and a dehydrating regimen was therefore indicated in treatment. Furstenberg and his associates³² reinvestigated the problem sometime later, and showed evidence that a retention of sodium was of greater pathogenic significance in the production of symptoms than was a retention of water. They recommended a diet with a low sodium content and the ingestion of ammonium chloride. Since both regimens achieved certain success, it seemed expedient to us³³ to investigate the constituents of the blood before and after treatment. This was done in a group of 33 patients.³⁷ No increase in concentration of serum sodium was observed during a relapse. This appeared to exclude sodium retention as a significant pathogenic factor in production of symptoms. In 4 patients who were having severe symptoms, however, an increase in concentration of serum potassium was observed. This prompted us to consider several aspects of the regimens which have been recommended and found successful in many patients.

In a diet devised to provide for a low sodium

content, some increase in potassium usually occurs. Since a low-sodium and high-potassium diet was effective, it seemed reasonable to try a normal diet with potassium chloride added. To achieve this, approximately 6 gm. of potassium chloride in an aqueous solution was given daily. No modification of the normal diet was recommended. To date more than 50 patients have been treated in this manner. Most of those who have followed the recommendations have been benefited, although few have been relieved of all symptoms.

Those most severely affected appear to be helped most. Several patients who were having many severe attacks per month have had the incidence reduced to only a few a year. The severity and duration of each attack have been likewise diminished. All except one or two have been able to lead a relatively normal life without the fear of an unexpected incapacitating attack. Several discontinued the daily ingestion of potassium and experienced a return of symptoms after a period of a few days, return to the regimen was followed by a satisfactory alleviation of symptoms. One intelligent but skeptical patient performed this experiment three times before he was convinced of the merits of the high potassium intake. Similar satisfactory results have been reported by Chapman,³⁸ Graves,³⁹ Reese⁴⁰ and Schneider.⁴¹ Improvement in hearing has been claimed by some patients. We are skeptical concerning this alleviation. With diminution in tinnitus some improvement in hearing would be expected. The precise action of potassium chloride in patients with this syndrome is not known. As a working hypothesis it has been assumed that an increased concentration of serum potassium is indicative of the disruption of normal chemical mediation of impulses in the eighth nerve. Ingestion of potassium may restore normal equilibrium.

Because of the benefit in Ménière's syndrome, potassium salts have been given to patients who complained of one or more symptoms of the classical syndrome, but in whom the clinical picture did not warrant a presumptive diagnosis of this malady. The symptoms complained of included vertigo, tinnitus and deafness. Since potassium chloride is a relatively harmless material, its use seems justified when other forms of therapy are ineffective. The same amounts are recommended as in the treatment of Ménière's syndrome.

Cardiac Disease

Changes in cardiac action with variation in concentration of serum potassium have been reported. Inversion of T₁ and T₂ has been noted⁴² in dogs with high serum potassium levels. In 1930 Wiggers⁴³ reported alleviation of ventricular fibrillation in dogs following perfusion with a solution of po-

potassium chloride Sampson and Anderson⁴⁴ utilized this observation in human beings in the treatment of auricular and ventricular ectopic beats with tachycardia. In doses of 1 to 16 gm, potassium chloride was effective in restoring normal rhythm in 50 per cent of a small group of patients. It has been suggested that alteration of the electrocardiogram in acute coronary thrombosis⁴⁵ may be due in part to alteration in the level of potassium in the muscle.

Untoward Effects

The ill effects of excessive potassium ingestion are believed to be few. Oral administration of as much as 40 gm per day to patients with myasthenia gravis produced no recognized untoward effects. Gastrointestinal distress usually develops before a toxic amount has been ingested. With onset of gastrointestinal distress assimilation is retarded and excessive quantities are not absorbed. The harmful effects of potassium in untreated Addison's disease have been discussed. Other conditions associated with a diminished concentration of serum sodium and increased concentration of serum potassium, such as heat cramps, acute nephritis, pemphigus and dehydration, might be aggravated. Scudder, Zwemer and Truszkowski⁴⁶ called attention to the possible toxic effects of a high serum potassium in acute intestinal obstruction. With the storage of blood and development of blood banks the concentration of the potassium in the transfusion fluid must be considered. If whole blood is stored⁴⁷ there is a slow migration of potassium from the blood cells into the plasma. When this concentration exceeds 10 milliequiv per liter the blood is probably unsuitable for intravenous use in human beings.

SUMMARY

Certain aspects of the role of potassium in the body are reviewed. The action of potassium appears to depend on its effect as an electrolyte, as a substance concerned with carbohydrate metabolism, as an important mediator of the nerve impulse and as a participant in muscle contraction.

In allergic manifestations, Ménière's syndrome and familial periodic paralysis, from 2 to 10 gm of potassium chloride per day is effective. In myasthenia gravis from 30 to 40 gm per day may be indicated. In a few conditions a low potassium intake is desirable.

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTHEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., Editor

CASE 26141

PRESENTATION OF CASE

First Admission A thirty four year-old house wife was admitted to the hospital complaining of vomiting of four days duration

The patient had always been well until sixteen years before admission when, at the age of eighteen she became ill with the following symptoms: ankle edema, dyspnea, palpitation and cough. She had difficulty remembering her sickness. Supposedly the illness lasted about two weeks, and she was then apparently well until eight years before entry when another identical attack occurred. She was then told that she had heart trouble. Some five to six years before entry she had had an attack of tonsillitis, with "occasional" sore throats thereafter. About four years before entry another two-week illness was diagnosed as being due to a "leaking valve." Since that time she had been placed on digitalis, which she did not take regularly. Nine months before admission the patient was injured in an automobile accident, suffering severe bruises, without fractures, to the right chest. She was placed in an outside hospital where the right chest was tapped a few weeks later and a "large amount" of fluid removed, the character of which was not reported. This resulted in some improvement, but she continued to note orthopnea, cough and palpitation, without known ankle edema. After three months hospitalization she went home and remained in bed, and continued with digitalis. Two weeks before entry she was taken to a summer camp and was moderately active there, but was brought home five days before admission because of dyspnea, palpitation, ankle edema and cough. A physician ordered her to bed and placed her on digitalis, one "pill" every two hours. Instead she took two pills every two hours and began to vomit after having taken ten pills. She vomited every meal thereafter, but continued, nevertheless, to take the digitalis. It appeared that she took a total of 44 gr. in the five days before her admission, it was not known how much was regurgitated. She became quite orthopneic, edema of the legs increased rapidly, and she was alleged to have observed yellow vision but no diarrhea. For about two weeks before

admission she occasionally coughed up "bloody sputum, and she had lost 30 pounds in weight during the ten months before entry

Physical examination revealed an orthopneic, drowsy, pale, slightly cyanotic, ill appearing woman, who had a malar flush and distended neck veins and who raised small amounts of bright red sputum. The heart was enlarged to the left to the region of the anterior axillary line and to the right where its border faded into an area of lung dullness. There was a questionable diastolic apical thrill. The rhythm was grossly irregular, the apex rate was 69, the radial 54. There was a loud heaving impulse. A diastolic murmur was heard at the apex, and a soft blowing diastolic murmur over the aortic area. The pulmonary second sound was accentuated. The blood pressure was 130 systolic, 90 diastolic. The chest was dull up to the angles of the scapulas posteriorly, high in the axillae laterally, and to the fourth ribs anteriorly. The right base was flat. Moist rales were heard in the area of dullness. No rales or breath sounds were heard at the right base. The abdomen was moderately distended with questionable ascites. The liver edge was palpated three fingerbreadths below the costal margin. There was edema of the sacrum, and deep pitting edema of the lower legs. The remainder of the physical examination was negative.

The temperature was 102°F., the pulse 90, and the respirations 30.

Examination of the blood revealed a red-cell count of 4,800,000 with 90 per cent hemoglobin and a white-cell count of 16,700 with 85 per cent polymorphonuclears. The urine showed a large trace of albumin, and the sediment contained 10 white blood cells, 5 red blood cells and occasional granular and hyaline casts per high power field. A stool was guaiac negative. A blood Hinton test was negative. The blood non-protein nitrogen was 44 mg. per 100 cc., the serum protein 6.3 gm., and the icteric index 8 per cent, a direct van den Bergh test was slightly above normal.

Roentgenograms of the chest showed that the diaphragms were unusually high on both sides. The lower portion of the cardiac shadow was obscured by the high diaphragm and by hazy dullness occupying both bases. The heart shadow, however, appeared to be grossly increased in size, both to the right and to the left of the spine. The upper portions of the lung fields were clear. An electrocardiogram taken two days after admission showed auricular fibrillation, with an auricular rate of about 400 and a ventricular rate of about 80. The T wave changes were consistent with a digitalis effect.

In about three weeks the patient's temperature gradually fell from a daily average of 100 to 101°F to normal. The apical pulse averaged some 80 to 90 beats a minute, with a radial deficit of 3 to 7 beats. The white-cell count remained elevated around 14,000. A seven-foot film of the heart taken three weeks after admission demonstrated that the greatest enlargement was across the base in the region of the auricles. The pulmonary conus was prominent, and there was an increase in the angle of the bifurcation of the trachea. There were several hazy areas of mottling distributed throughout both lung fields. The right base was clear. Both hilus shadows were grossly increased in width and density, a finding apparently due to venous congestion.

The patient continued to raise decreasing amounts of blood-tinged sputum throughout the hospital stay of seven weeks. She was digitalized, given bed rest and was discharged slightly improved.

Second Admission (almost four years later) The patient had been taking 1½ gr of digitalis daily and had been fairly well, with only limited activity, until ten weeks before entry, when she developed a head cold. She did not go to bed, and when the cold cleared, she noticed a recurrence of ankle edema, dyspnea, orthopnea and cough. There were no hemoptyses or other symptoms.

Physical examination was essentially unchanged from that of four years previously, except that a late diastolic rumble and early systolic blowing murmur were heard at the apex. An early blowing diastolic murmur at the base was best heard at the second intercostal space on the left. Another examiner found an early diastolic murmur following immediately after the second pulmonic sound (Graham Steele murmur). The red-cell count was 6,500,000 with 112 per cent hemoglobin, and the white-cell count 14,500 with 80 per cent polymorphonuclears. The urine showed a +++ albumin test. Roentgenograms of the chest showed that the heart had a mitral configuration and that there was haziness in the right lower lung field suggestive of multiple small infarcts. Eight days later a portable chest plate showed a small amount of fluid in the right pleural cavity. A definite infarct was not visible. The electrocardiogram was unchanged from the previous admission. The venous pressure was 120 mm of water.

With bed rest, digitalis and diuretics the patient gradually improved and was discharged on the nineteenth hospital day to a nursing home.

Final Admission (six months later) The patient was not well following her discharge. She had repeated hemoptyses and led a life of invalidism. She was bed-ridden for six weeks before her final admission. Nausea and vomiting were re-

lieved five days before entry by omitting digitalis, but her edema increased. It was stated that she had always had an abnormal tendency to bruise easily, but it had become more marked. Mottling appeared over her arms and legs, and large confluent black-and-blue ecchymoses on her fingertips and toes, these were sensitive at first. There had been no pain in the left upper quadrant of the abdomen. She had, however, passed "red" urine during the week before entry, so much so that she wondered if her menses had not begun.

Physical examination revealed an apathetic woman who appeared gravely ill. The malar flush was prominent and was purplish. There were many splinter hemorrhages and large ecchymotic areas on the tips of the fingers and toes, together with mottling of the extremities. The entire body, including the face, eyelids and arms, was waterlogged. The breath was foul but not uremic. The neck veins were distended, and yet the patient was able to lie flat in apparent comfort. The chest was almost clear of rales, but there were signs of fluid on the right. The heart was as previously described except that there was a grossly irregular but fairly consistent bigeminal and occasionally trigeminal rhythm, with a pulse deficit of 40 and a soft mid-diastolic murmur maximal at the pulmonic area and transmitted down the left border of the sternum. The pulmonic second sound was much louder than the aortic. The blood pressure was 140 systolic, 80 diastolic. The liver was just palpable, and the abdominal wall was so edematous that further examination was impossible.

The temperature was 100.2°F, the pulse at the wrist 86, and the respirations 20.

The blood showed a red-cell count of 6,600,000 with 125 per cent hemoglobin, and a white-cell count of 20,800 with 84 per cent polymorphonuclears. The color index was 1.05, and the mean corpuscular volume 100. The urine showed a ++++ albumin test, and the sediment contained 5 to 6 red cells and innumerable white cells per high-power field. The serum non-protein nitrogen was 78 mg per 100 cc. The hematocrit was 65, the uncorrected sedimentation rate 0.2 mm per minute, the blood clotting time 10 minutes, the bleeding time 1.5 minutes, and the clot retraction normal. The venous pressure was 170 mm of water. An electrocardiogram showed low T₁ and T₂ and inverted T₃, Q₃ was 7 mm, there were runs of bigeminal rhythm and auricular fibrillation, with ventricular premature beats.

On admission the patient appeared to be *in terminus*, but following treatment with Salyrgan and omission of digitalis she rallied for a time. The temperature ranged upward to 100 or 101°F daily, and although she had sufficient diuresis, she failed

gradually and went into a state of peripheral vascular collapse with icy extremities, impalpable pulse, absent blood pressure, extreme cyanosis, dyspnea and profuse sweating. She was placed in an oxygen tent, but died on the twentieth hospital day.

DIFFERENTIAL DIAGNOSIS

Dr. T. DUCKETT JONES. It is very interesting that ankle edema, dyspnea, palpitation and cough are frequently repeated throughout the record, and it is fair to assume that at the age of eighteen the patient had congestive heart failure. I also should be willing to suggest in view of the absence of a previous history of heart disease that she had rheumatic heart disease and had insidiously developed mitral stenosis. It is further suggested that active rheumatic fever was probably responsible for the congestive failure.

At the age of twenty-six she again had what seems to be a mild episode of congestive failure, probably again on the basis of acute rheumatic fever. At thirty she had another episode and valvular heart disease was diagnosed. Auricular fibrillation may have begun at this time, but I should doubt it because of the subsequent events.

Following the automobile accident, she had a long period of illness with weakness and congestive failure, and I presume that the right chest fluid was either the fluid of congestive failure or of pleuritis coincidental with active rheumatic fever. Whether the accident had anything to do with precipitating the rheumatic fever is problematical but we have seen a good many cases in which there was an apparent association between an operation, accident or non-streptococcal event and recurring rheumatic fever.

Apparently she had digitalis intoxication, although there seems to be some doubt as to the actual amount of the drug which the patient retained.

It is obvious that for almost a year prior to admission to the hospital she had had some active disease process which resulted in a great deal of weight loss, and it is possible that the accident increased the symptomatology. We are not certain, however, of the actual existence of symptoms prior to that time. It is possible also that auricular fibrillation may have started shortly after the accident and that its onset began the gradual downhill progress.

The distended neck veins and bright red sputum suggest that she may have had a pulmonary infarct or infarcts.

Apical thrill is not common in rheumatic heart disease with auricular fibrillation for obvious reasons.

The accented pulmonic second sound is probably indicative of mitral stenosis.

The patient had slight fever and perfectly good evidence of an active disease process. Congestive failure was present in a patient with probable mitral and aortic disease, and there was nothing very unusual about the picture as presented at the time of the first admission.

The negative Hinton test is of interest in view of the differential diagnosis to be discussed later. I regret that there was no venous pressure recording on the first admission. It might be of some help in clarifying the subsequent events.

The sedimentation rate was not determined, but this would not have been helpful in view of the presence of a large liver.

The pulmonary conus was prominent, and there was an increase in the angle of the bifurcation of the trachea. She probably had quite large auricles, and conspicuous enlargement near the base of the heart would probably account for this x-ray finding.

There were several hazy areas of mottling distributed throughout both lung fields. This is in keeping with pulmonary infarcts or pulmonary changes seen at times during rheumatic fever.

Seven weeks is a very long period for a patient with ordinary congestive failure to have hemoptysis. She did not have spells of severe orthopnea with pulmonary edema, which are common in the patients with mitral stenosis who have hemoptysis. Apparently she improved slowly, despite the fact that during her few weeks stay in the hospital she had evidence of something continuously going on in the lungs in addition to the picture of congestive heart failure. The symptomatology was very much the same as that of her earlier bouts of congestive failure.

Physical examination at the time of the second admission, nearly four years later, showed a decided change in the patient. The description of a Graham Steele murmur raises a question of considerable interest because such murmurs are rare, and one wonders if we are justified in making such a diagnosis unless congestive heart failure was present. It may be possible that this patient had two diastolic murmurs of very similar quality at the base of the heart.

The red-cell count was 6,500,000 with 112 per cent hemoglobin, and the white-cell count 14,500 with 80 per cent polymorphonuclears. This is the first time we have noted any evidence of polycythemia. The white count may be explained entirely on the basis of the polycythemia.

I do not know the extent of the peripheral edema, but I notice in the treatment that the patient received diuretics as well as digitalis. The

question might be raised as to why she developed such a high red-cell count. This polycythemic tendency was not very pronounced at the time of this admission. Apparently the tendency increased considerably in the six months between the second and the third or final admission. I think we can assume that the patient had pulmonary infarcts or something by x-ray which was very suggestive of pulmonary thrombosis. There had been a change in the clinical picture, and the pulmonary system began to assume a more and more important role. The cyanosis was very striking. Extensive cyanosis and ecchymotic areas over the tips of the fingers and toes are suggestive of extensive pulmonary changes and probably alteration of the minute peripheral vessels.

"The neck veins were distended, and yet the patient was able to lie flat in apparent comfort." That is a striking feature. I presume the venous distention was noted with the patient sitting erect. Such a combination is most unusual. There was obviously no extensive left-sided cardiac failure, because such patients are not able to lie flat comfortably. In children with rheumatic disease and cardiac failure one often sees right-sided heart failure, with high venous pressure, edema of the face, a large liver and peripheral edema. The lungs remain remarkably clear and the patient often prefers to lie flat. This is rarely seen in adults. In this patient there was little or no elevation of the venous pressure, and despite the lung changes the patient could lie flat. This strongly suggests that the pulmonary changes were not the result of ordinary congestive heart failure (left-sided failure).

"a soft mid-diastolic murmur maximal at the pulmonic area and transmitted down the left border of the sternum." This again could denote either an aortic diastolic murmur or the Graham Steele murmur of relative pulmonary insufficiency. The pulmonary second sound was louder than the aortic second sound. The patient had mitral stenosis and hence might have a good reason for an accentuated pulmonic second sound, but that is a helpful feature of the differential diagnosis that I shall give a little later.

"The liver was just palpable." This is another finding which suggests little, if any, right-sided heart failure. Large painful livers are often an outstanding feature of failure of the right side of the heart.

Apparently she did not have a palpable spleen at any time. The blood examination still showed a definite polycythemia, with perhaps infection as indicated by the increase in polymorphonuclears. I should doubt any serious alteration in the blood-forming organs.

The hematocrit was 65, in keeping with the polycythemia. There was abundant evidence that the patient did not have thrombocytopenic purpura. There was a distinct increase in retention of the nonprotein nitrogen since the preceding admission. A level of 78 mg per 100 cc. is fairly high for a patient with ordinary congestive failure.

"The venous pressure was 170 mm of water." That is not very high. I suppose it is an indication of some degree of congestive failure, especially of the right side of the heart, but there is considerable variation in venous-pressure technics. I am not familiar with the exact routine used in the medical wards, but with probably the same method, we usually observe tremendous increases in venous pressure even long before evidence of peripheral edema. Here was a liver that was but little enlarged, and a patient who could lie flat in bed. I should presume on the basis of these facts that congestive heart failure was not severe.

Dr. White will probably mention the electrocardiogram because it offers suggestive evidence of the presence of pulmonary infarction. Also the probability of pulmonary hypertension comes into play because of the finding of a very strong pulmonic second sound and the persistent hemoptysis. The story and findings fit in with massive pulmonary infarction or thrombosis.

This is an exceedingly difficult differential diagnosis. It is not the usual problem met in cases of rheumatic fever and heart disease. The first few years are in keeping with those of a patient who has developed insidious rheumatic heart disease and probably repetitive bouts of congestive heart failure. It is safe to assume that she had rheumatic heart disease, mitral stenosis with auricular fibrillation, probably mild aortic disease and, possibly, pulmonary disease. These features, however, do not explain the patient's death. In other words, I do not believe she died as a result of either rheumatic heart disease per se or of acute rheumatic fever in the ordinary sense of fulminating rheumatic fever. There are some features difficult to explain, for instance the massive edema and the relatively little evidence of nephritis. The retention of nonprotein nitrogen and the urinary findings hardly explain the death on the basis of acute glomerulonephritis, so I think we must try to explain the syndrome largely on the basis of a disease or change in the blood vessels.

The first thing that comes to my mind is periarteritis nodosa. She had many of the features of this disease, but not all of them, and the blood picture is distinctly contrary to the usual finding. We know that in such cases 80 per cent may show renal changes. No peripheral nodes were noted. I should say that the chief feature against peri-

arteritis nodosa is the fact that there was not enough evidence of arterial change in various locations. In periarteritis nodosa the large vessels are not usually involved, in this patient, apparently there were changes in the large vessels of the pulmonary tree. In addition, there have been some extraordinary pulmonary specimens reported in which extensive arterial nodules occurred in the lung tissue, without appreciable alteration in the pulmonary circulation.

I think the advanced edema was not entirely the result of congestive heart failure, but to some extent probably dependent on hypoproteinemia. There is no mention of the serum protein during the last illness.

At the end the patient presented a picture much like Ayerza's disease. That, as you know, is supposed to be syphilitic in origin, but we have no evidence in this patient of a syphilitic process. There have been a small number of pathologists who have constantly written about pulmonary changes in rheumatic fever of an arterial nature. Four years ago Parker and Weiss¹ reported a case which, except for two features, was very similar to this one. Their patient had pulmonary edema in increasingly severe episodes and died, but did not have massive peripheral edema. Gouley² and his co-workers in Philadelphia have written repeatedly about pulmonary fibrosis and changes that occur in rheumatic fever and have stated that the reason for failure of the right side of the heart is often the result of pulmonary change. We have seen very little of this in gross pathological specimens and no real syndrome clinically. However, Cash,³ at the University of Virginia, has been impressed with the great frequency with which you get in fatal changes in moderate sized and small sized blood vessels in patients with rheumatic fever, particularly in those who have had the disease over a period of years. The case Parker and Weiss described had extensive changes in the fair sized arteries of the lungs and in the small arterioles. They compared this change with that which is found in malignant nephrosclerosis, and I think it is fairly obvious that this patient must have had some change in the blood vessels of the lung over a fairly long period of time. She probably had hypertension of the pulmonary circulation and coexistent changes in the blood vessels in other parts of the body. Changes in the pulmonary vessels were probably responsible for the rather progressive nature of the disease and for the fatal outcome. Whether it can be said that she was suffering from chronic cor pulmonale I do not know. Ayerza's disease is of course very much of this nature, but I do not believe that the patient had this type of change. However, she

did not present the syndrome of acute cor pulmonale with a rapidly terminal course. The chronicity of the process is somewhat against ordinary pulmonary infarction or thrombosis as the cause of the whole difficulty. I think she would have died much sooner with a less severe generalized disease process if this had been true. The picture, as I see it, is probably one of pulmonary arterial disease, possibly on a rheumatic basis. Of the latter I am not sure, but I should say that the process was not limited to the pulmonary arteries but extended throughout the body, although the changes were more pronounced in the lung and kidneys.

DR. FREDERICK T. LORD: Was a blood culture taken?

DR. TRACY B. MALLORY: I can find no record of it.

DR. LORD: The picture suggests that she might have had right sided endocarditis with pieces breaking off and going into the lungs.

DR. EDWARD F. BLAND: The x-rays are not here, but I should like to raise the question of a possible complicating interauricular septal defect plus the mitral stenosis. It would be difficult to make this diagnosis without seeing the films and the electrocardiogram. This combination may give a curious x-ray picture with especially prominent lung changes. I should like to ask Dr. Jones if he would want to consider that combination here.

DR. JONES: I think it is possible but there is no real evidence to support the diagnosis. This whole thing could be explained on the basis of a congenital defect in addition to mitral stenosis, but there is no early story suggesting a congenital defect, and the age of the patient is somewhat against such an association of lesions over a period of at least sixteen years. I thought very seriously of whether something could have developed in the nature of an arteriovenous aneurysm, but there is no evidence to support such a diagnosis. It is possible that such a shunt may have had something to do with the picture.

DR. PAUL D. WHITE: Dr. Jones has done extremely well. Have we the electrocardiogram? It would be of value in determining whether an interauricular septal defect was present. I find that the angle of the axis is only 90°. The only cases of congenital auricular septal defects that we have followed through have had marked right axis deviation (110° or more). This finding is against the diagnosis of auricular septal defect. The electrocardiogram, to be sure, does show rather large Q waves in Leads 2 and 3, which may be explained on the basis of any factor causing enlargement of the right ventricle. It is possibly the result

of a cor pulmonale of the acute, subacute or chronic type. But the record is not clear-cut, perhaps due to a combination of factors.

Some of the events that had happened in the past were probably episodes of pulmonary infarction. We know that such infarcts can occur in acute rheumatic disease as well as from embolism of whatever cause.

I do not know whether my auscultatory findings were accepted by those who wrote up the record, they are not mentioned here. It intrigued me on the wards a few days before she died that there was a striking diastolic rumble close to the left border of the sternum at its lower end, which was almost as marked as any that I have heard at the apex in mitral stenosis. She had not shown this a year or two before, as we found out by looking back through the outpatient record. It was a murmur that made one think strongly of tricuspid stenosis. It followed a very loud, blowing, early diastolic murmur heard in the pulmonic-valve area. There was no doubt about the pulmonary diastolic murmur being a Graham Steele murmur, it was very loud and heard maximally in the pulmonic-valve area after a very loud second sound. I thought there were three separate murmurs, namely those due to mitral stenosis and to pulmonary regurgitation and something that resembled the murmur of tricuspid stenosis. I do not know whether we suggested the possibility of a right-sided Austin-Flint murmur then, but that came up later.

The final point that interested us was the condition of the fingers and toes (mottling and ecchymoses) and the very marked cyanosis, it made us think of a ball thrombus in one auricle or the other. Because of the novelty of the case we suggested that it might be in the right rather than in the left auricle, but that was a wild guess.

CLINICAL DIAGNOSES

Rheumatic heart disease, with mitral stenosis
Tricuspid stenosis, with auricular fibrillation?
Congestive failure
Pulmonary infarction
Compensatory polycythemia

DR JONES'S DIAGNOSES

Rheumatic heart disease
Mitral stenosis
Auricular fibrillation.
Congestive failure
Compensatory polycythemia
Arterial thrombosis or fibrosis, pulmonary and renal (? rheumatic)

ANATOMICAL DIAGNOSES

Rheumatic heart disease, chronic, with mitral stenosis

Endocarditis, acute rheumatic, aortic, mitral and tricuspid

Cardiac hypertrophy and dilatation

Thrombosis of left pulmonary artery

Thrombosis, massive, of left auricle

Thrombosis, left renal artery, abdominal aorta and common iliac arteries

Pulmonary infarcts, healed

Renal infarcts, fresh and healed

Anasarca

PATHOLOGICAL DISCUSSION

DR MALLORY. This was obviously a most complicated clinical picture, and the autopsy findings were equally complicated and numerous. The primary underlying condition was rheumatic heart disease with mitral stenosis. The degree of mitral stenosis, however, was not severe. The circumference of the valve was 5 cm so that on anatomical grounds under ordinary conditions one would not expect a heart to fail this rapidly. This valve and the aortic and tricuspid valves all showed small pin-point vegetations suggestive of acute rheumatic involvement. We found nothing to suggest bacterial endocarditis. The right side of the heart was very markedly dilated, both auricle and ventricle, and there was considerable bulging of the pulmonary conus, a very characteristic finding in cor pulmonale. The main pulmonary artery was also markedly dilated, and the major branch of the left lung was almost completely occluded by old organized thrombus. The branch to the upper lobe was totally occluded, that to the lower lobe almost completely occluded. There were also several depressed scars on the pleural surface, which on lengthy investigation in the hands of Dr Castleman were eventually proved to be healed infarcts. There was one fresh pulmonary infarct, 7 cm in diameter, in the other lung, not a strikingly large one and not adequate to explain the sudden death.

Another peculiar finding which may possibly have had functional significance was an enormous thrombus in the left auricle which was so large that only a small lumen, a little over 2 cm in diameter, was left. The mouths of the pulmonary veins were impinged on by this thrombus, and it was difficult to understand how the blood got back from one lung.

The other major finding was in the systemic circulation where a large thrombus was found beginning just below the diaphragm in the abdominal aorta and extending all the way down into the iliac arteries. The degree of narrowing varied from one to two thirds of the diameter. It overlaid the mouth of the left renal artery, and the

thrombus extended out into the small intrarenal branches. This and the aortic thrombus were obviously old, being completely organized, the left kidney had shrunk to 25 gm in weight but what remained of the kidney tissue was viable. On the right there was fresh infarction of the major part of the kidney, so I should think there must have been a considerable element of uremia in the picture. Whether it was enough in itself to have caused death, I am not sure. For the dramatic terminal episode I have no explanation. We did not have permission to examine the head. Conceivably something there might have been responsible for it.

Dr. WHITE May I add one further comment about the mid-diastolic murmur in the tricuspid valve area? In the absence of tricuspid stenosis it should be regarded, I think, as right sided Austin Flint murmur.

Dr. JONES What about the blood vessels in the lungs?

Dr. MALLORY I could see nothing in them that I could recognize as a specific arteritis. The larger vessels showed obliteration, which I interpreted as the result of organization of thrombi. The small arteries of the lungs did show diffuse thickening of the walls of the type Parker and Weiss described. This condition was extensive and no doubt contributed to the picture.

Dr. HOWARD B. SPRAGUE Is this a case of partial renal ischemia without hypertension?

Dr. MALLORY We have seen so many that I did not remark about it.

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CASE 26142

PRESENTATION OF CASE

A thirty-two-year-old American dye machine operator entered complaining of numbness of the left leg.

Three months before entry he noticed numbness in his left foot. This condition gradually spread up the leg to the thigh and finally to the abdomen. He noticed that the numbness stopped exactly in the mid-line. During the following two months the left chest and arm gradually became involved. The numbness was described as an inability to appreciate pain or to feel things as well as usual. He was unable to distinguish hot from cold but noted that hot water produced a burning sensation which was quite unpleasant and painful. He also

noticed that the right side of his face felt numb while shaving. Two months before entry his voice became weak toward the end of the day and he was unable to produce any sound. He began having attacks of hiccups, usually about 10:00 a.m. These were relieved by drinking cold water. One month before entry he noticed difficulty in swallowing. Solid food seemed to "stick" in his throat. Approximately two months before entry he developed unsteadiness of gait, characterized by deviation to the right, so much so that his friends thought he was intoxicated. During the month before entry he developed right occipital headaches just above the mastoid. These headaches often spread throughout his head. There was no history of tinnitus, dizziness, vomiting, aphasia, or blurring or double vision. These symptoms as they developed lasted until admission with no improvement.

His family and past histories were noncontributory. He had been married eight years. His wife and two children were living and well. There had been no miscarriages.

Physical examination showed a well-developed and well-nourished man in no acute distress. Except for a few slightly enlarged axillary and inguinal nodes the examination was negative. The blood pressure was 135 systolic, 85 diastolic.

A neurological examination gave the following positive findings. There was loss of pain and temperature sensations on the left side of the body. Touch and vibration sensations everywhere were normal. The right pupil was slightly smaller than the left. There was rotary nystagmus. The corneal reflex was absent on the right and active on the left. The hearing was normal. Air conduction was greater than bone conduction. The Weber test was not lateralized. The palate was deviated to the left, and the gag reflex on the right was diminished. There was a questionable weakness of the right side of the tongue. When standing he deviated to the right almost constantly. His tendon reflexes were all active and equal on both sides. The abdominal and plantar reflexes were normal.

The temperature was 98°F, the pulse 76 and the respirations 20.

Examination of the urine was negative. The red blood-cell count was 5,660,000, with a hemoglobin of 100 per cent. The white-blood-cell count was 7400, with 79 per cent polymorphonuclears. A blood Hinton test was negative. On lumbar puncture 15 cc. of clear colorless fluid was withdrawn. The initial pressure was 145 mm of water; the pressure rose to 300 mm on jugular compression and immediately fell to its previous level on release. An alcohol test was positive, and an am

monium sulfate test negative, no cells were found. The total protein was 38 mg per 100 cc, the gold-sol and Wassermann tests were negative.

During the first four days in the hospital he developed nausea, vomiting and increased difficulty in talking and swallowing. He also complained of considerable dizziness, which was partially relieved by lying on his right side. The impairment of pain and temperature sensations gradually spread and involved the left face, as well as the right face and left side of the body. There was considerable nystagmus, although the eyes moved well. His hearing remained normal. During the second and third weeks he was treated with six small doses of x-rays. His symptoms improved somewhat, although none of the important signs which were present on admission entirely disappeared. At the time of discharge from the hospital, during the fourth week, he had slight hypesthesia of the right side of the face but no facial weakness. The nystagmus to the left and the unsteadiness of his right arm and leg had diminished, also the vomiting and hiccups. There was slight but definite improvement in the ability to recognize changes of temperature on the left side. On the other hand, fibrillations and atrophy of the right half of the tongue, signs which were not present on admission, developed during his stay in the hospital.

While at home he continued to improve subjectively. An examination performed by his physician one month after discharge showed marked weakness of the right arm and leg not limited to any muscle group. The uvula deviated slightly to the left. He complained of marked right occipitoparietal headaches. During the following month there was much more marked subjective improvement. The headaches disappeared almost completely, and his walking improved to the extent that he was able to go downstairs without help. His appetite was good, and there was an evident gain in weight. There was only an occasional hiccup. Examination two months after discharge showed slight nystagmus. There was no definite facial weakness, but wrinkling of the forehead was perhaps slightly less on the right than on the left. The uvula was in the midline but deviated to the left with phonation. Sensory impairment similar to that described above persisted. Position sense was normal. The reflexes were active and equal. There was considerable staggering on walking.

During the third month after discharge from the hospital his walking became progressively worse, his headaches returned and he became decidedly depressed mentally. He threatened suicide and on the day before death, exactly three months after discharge from the hospital, attempted to hang

himself. He was admitted to a hospital where he received sedatives. That evening his respirations decreased and his pulse could not be felt. One hour later he developed sudden respiratory paralysis and died.

DIFFERENTIAL DIAGNOSIS

DR RAYMOND D ADAMS. The initial complaint, that of numbness of the left leg, is readily explained by the finding of hypalgesia and thermohypesthesia, both of which are signs of a lesion involving the lateral spinothalamic tract. The progression of the numbness from leg to trunk and upper extremity is possible because of the lamination of the fibers within the lateral spinothalamic tract, the leg fibers which are most lateral being involved first. I do not know how to interpret the unpleasant burning sensations. Since there was no sensory disturbance over the left side of the face, the lesion of lateral spinothalamic tract must have been in the medulla or pons below the point where the ventral trigeminal lemniscus joins the lateral spinothalamic tract. The loss of pain and temperature sensations on the right side of the face and the absent right corneal reflex mean involvement of the spinal tract and the nucleus of the trigeminal nerve. Again this involvement must have been between the mid-pons and medulla oblongata to account for all the divisions of the trigeminal nerve that were affected. This crossed sensory disturbance places the lesion in the medulla or pons on the right side.

The next developments — dysphonia, dysphagia, the absent right gag reflex and palatal deviation to the left — signify involvement of the right nucleus ambiguus, which lies just medial to the lateral spinothalamic tract. Singultus is a respiratory reflex and undoubtedly of central origin in this case, presumably from a disturbance in some of the connections of vagus nerve, such as the nucleus of the tractus solitarius or the nucleus intercalatus. These additional findings locate the lesion in the medulla, more specifically in the retro-olivary region.

Unsteadiness of gait with deviation to the right and inco-ordination of movements of the right arm and leg are cerebellar signs. In this case they were probably due to interruption of the right spinocerebellar tracts. The tracts are just lateral and dorsal to the lateral spinothalamic tract, the spinal nucleus and the tract of the trigeminal nerve.

Slight miosis of the right pupil was observed, but the other components of Horner's syndrome are not mentioned. Pupillodilator fibers from the hypothalamus to the cervical spinal cord (descending sympathetic tract) pass through the reticular

substance of the medulla very close to where the lesion appears to have been. This tract is uncrossed, hence the ipsilateral sign.

Nausea, vomiting and vertigo, without tinnitus or deafness, can only mean a central vestibular disturbance. The spinal vestibular nucleus and its connection with the dorsal motor nucleus of the vagus afford a ready explanation of these symptoms. The rotary nystagmus is on this basis.

The loss of pain and temperature sensations on the left side of the face makes us think of a lesion of the ventral trigeminal lemniscus tract after it has crossed. This tract originates in the nucleus of the spinal tract of the trigeminal nerve and decussates almost immediately, coming to lie along the ventromedial portion of the medial lemniscus in the upper pons it joins the lateral spinothalamic tract and continues to the ventral nucleus of the thalamus. Thus, the lesion extended medially and interrupted this tract after it had decussated.

Another indication of a medial extension of the lesion was the atrophy and fibrillation of the tongue. This is caused either by destruction of the right hypoglossal nucleus or the fibers of this nucleus as they course ventrally toward the pyramidal tract.

The weakness of the right arm and leg, which was observed only once and then without reflex changes, I shall place in the group of cerebellar signs, there is no evidence of pyramidal-tract disease. The facial weakness was too uncertain to consider seriously. The depressed mood which led to his suicidal attempt I cannot put on a neurological basis. Lesions of the posterior hypothalamus are associated sometimes with apathy, drowsiness and depression, but here it is safer to consider the depression as a reaction to an incurable disease. The right occipital headaches confirm the lateralization, which is well established; they are not a sign of increased intracranial pressure.

From these data I think we can be sure of a single lesion in the right tegmentum of the medulla oblongata at about the level of the olive, involving, in order, the lateral spinothalamic tract, the spinal nucleus and tract of the trigeminal nerve, the nucleus ambiguus, the dorsal and ventral spinocerebellar tracts, the nucleus solitarius and its tract, the spinal vestibular nucleus, the dorsal motor nucleus of the vagus nerve, the ventral trigeminal lemniscus and the hypoglossal nucleus.

There occur to me five possible causes of such a lesion. An occlusion of the right vertebral and right posterior inferior cerebellar artery produces a retro-olivary syndrome. The gradual onset and progression of symptoms is unlike a vascular lesion, due either to hemorrhage or to thrombosis. Also

the lingual atrophy and the loss of pain and temperature fibers from the opposite side of the face are not parts of this syndrome, so more than one vessel would have to be occluded.

Tuberculoma must always be considered in a progressive lesion of the medulla, pons or cerebellum. There is not sufficient positive information, such as signs of pulmonary tuberculosis, fever and leukocytosis, on which to make such a diagnosis, but it cannot be excluded.

Syringobulbia is a diagnosis which must be mentioned in passing chiefly because it sometimes produces lesions in this region of the central nervous system. However, rapid progress of the lesion and an early fatal termination are unusual, and the lesion in this case appears to be too discrete. I cannot dismiss this diagnosis with certainty but consider it less likely than those which follow.

Acute multiple sclerosis or encephalomyelitis, a disease entity which most neuropathologists prefer to separate from ordinary multiple sclerosis, is a possibility. However, the onset of symptoms and signs is more acute and the remissions are more certain than any which were found in this case. Particular attention is called to the statement that although there was improvement in some of the signs none of the important ones ever disappeared. If a single sign had completely cleared up, even after roentgen therapy, we should probably have to consider acute multiple sclerosis as the most likely diagnosis. The fact that the signs point to a solitary lesion and not to disseminated ones is also against this diagnosis.

The most probable cause of this clinical picture is an intramedullary glioma. The insidious onset, the slow progression of symptoms, and the manner in which adjacent tracts and nuclei were involved all favor this diagnosis. As to the type of tumor, we can only guess, spongioblastoma multiforme, spongioblastoma polare and astrocytoma are the commonest. We have no reason to suspect a lymphoma or a metastasis of a tumor elsewhere in the body. The laboratory data are of no help. Evidently the attending physician also diagnosed tumor and prescribed x-ray treatment. Signs of increased intracranial pressure occur late in brain stem tumors and are not necessary for the diagnosis of a tumor of the medulla.

The patient died of respiratory failure. Whether the hanging or the sedation were contributory factors I cannot say; the lesion itself probably was sufficient.

CLINICAL DIAGNOSIS

Encephalomyelitis?

DR ADAMS'S DIAGNOSIS

Glioma of right tegmentum of medulla oblongata.

ANATOMICAL DIAGNOSIS

Glioblastoma multiforme of medulla

PATHOLOGICAL DISCUSSION

DR CHARLES S KUBIK Dr Adams has made a very good analysis of the symptoms and findings, and his diagnosis is correct both as to the nature of

the lesion and its localization. There was a diffusely infiltrating glioma of the right side of the medulla. It measured from 3 to 4 cm in diameter and involved the whole of the right side dorsal to the inferior olive. It apparently did not extend beyond the midline or into the pons. Microscopically it was a glioblastoma multiforme. The case is rather unusual in that the tumor was restricted to the medulla. Most of the gliomas of the brain stem involve the pons or the pons and midbrain. These too may be, and often are, limited to only one side of the brain stem.

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EDUCATIONAL QUALIFICATIONS FOR HEALTH OFFICERS

THE Committee on Professional Education of the American Public Health Association has recently issued a report* in which it discusses the educational background desirable in the training of health officers. The difficulties encountered by this committee must be very like those encountered by the "boards" of the various specialties. It is not easy to maintain a balance between the practices of the past and the theories of the future. In the same breath that they state the optimal educational advantages which should be insisted on they must also admit that the optimal performance at which they aim has been repeatedly achieved by individuals whose educational advantages were de-

ficient if measured by the standards they wish to promulgate. The result is that such committees and boards must tread lightly until they have established themselves and their principles.

In the field of public health it would seem that a few major principles have been established. The first recommendation of the committee is as follows: "That candidates for appointment as health officer should be graduates of approved medical schools who have completed successfully not less than one year of internship in an approved hospital and in addition a course of not less than one year of graduate instruction in a university, leading to a degree in public health." From this it would seem that the medical degree has been accepted as a necessary possession for all who covet a recognized career in public health. This is a significant decision because the field is occupied by a large number of associated professions. It expresses the belief that public health cannot be effectively administered by those who do not understand the language of the medical profession. The same is already true in other fields, such as those of hospital administration, industrial health and the trained varieties of social service.

Thus in many fields the degree of Doctor of Medicine may be utilized as a preliminary attainment beyond which the individual fully intends and is expected to narrow himself into a more limited proficiency. Recently a twenty six year-old nurse anesthetist embarked on a ten year program in order that she might become an anesthesiologist. It is sometimes difficult to know whether our educational systems are preparing their votaries to serve themselves or their fellow men and women, or perhaps they are already too vast to be anything more than gigantic information bureaus. The best of them graduate relatively inexperienced individuals, and this is covered by the second recommendation: "That recognition be given to the fact that practical experience in public health administration is an essential part of the education of a health officer."

A committee formed by the Massachusetts Central Health Council to make inquiry into this subject has recently reported similar difficulties in

*The educational qualifications of health officers. *Am J Pub Health* 1939.

framing suitable standards. This committee however, did uncover a law in Connecticut that requires that county health officers be lawyers! While it is doubtful that public-health law is as yet sufficiently involved to make this a wise requirement, if this or any other provision might ensure good administrative ability on the part of the officer it would, to that extent, have merit. Whereas a competent administrator can readily get technical advice, a competent technician needs more than advice to do a good administrative job.

The superior health officer, anesthetist, hospital superintendent or anyone else will remain the person whose graciousness, personality and intuitive appreciation of what is fitting on all occasions equal or surpass his knowledge of mere technics.

ADVANCES IN CANCER CONTROL

THE American Society for the Control of Cancer and its managing director, Dr. Clarence C. Little, deserve congratulations for the pamphlet* issued by the Public Affairs Committee, entitled *The Fight on Cancer*. It is short and readable, with graphic presentation of figures. The one point that might be objected to is the all too frequent error of overestimating the curability of skin cancer. The familiar figure of 95-per-cent curability in early cancer as against 30-per-cent curability late in the disease is given, whereas careful analysis of large series shows that even in very favorable lesions, and omitting such forms as malignant melanoma, only a little over 90 per cent are curable, and in taking advanced cases, 20-per-cent curability is perhaps a generous estimate.

The section on research in cancer is very clear and useful. One of the most important phases of cancer investigation—the field of radiation therapy—is, perhaps wisely, not touched on in this pamphlet. In Boston, thanks to the efforts of the pioneer radiologists and their successors of the present day, together with an unparalleled cooperation of the departments of physics and of chemistry of Harvard University and the Massachusetts Institute of Technology with the various cancer investigation and treatment centers, there

has developed an armamentarium for the study of the efficacy of radiation therapy that is duplicated nowhere else in the world. With x-ray apparatus ranging from the ordinary therapeutic types through machines of 400,000 to 1,000,000 volts in constant use, with a 3,000,000-volt x-ray machine approaching completion at the Massachusetts Institute of Technology, with an adequate supply of radium and radon, with practically unlimited opportunity for the making of temporarily radioactive compounds through the two great cyclotrons at Harvard University and the Massachusetts Institute of Technology, there is an ideal situation for the development of knowledge along these lines. If radiation therapy does not make great strides in the control of cancer in the next few years, it will not be for lack of personnel or equipment, at least in Boston.

MEDICAL EPONYM

BLAUD'S PILL

Paul Blaud (1774–1858), chief physician of the hospital at Beaucaire and corresponding member of the Royal Academy of Medicine of France, is chiefly remembered for his famous pill, the formula of which was given in an article presented to the Royal Academy of Medicine, August 23, 1831, entitled "Memoire sur les maladies chlorotiques, et sur un mode de traitement spécifique dans ces affections [An essay on the chlorotic affections and a specific method of treatment]." This appears in the *Revue médicale* (1:337–367, 1832). A portion of the translation follows:

Iron has always been used in chlorosis, for which it has been considered a specific, but all practitioners know how uncertain is its effect in this disease, and how often it fails, a failure which results from the feeble doses administered, and from the fact that it is given in an unsuitable form. Modify the iron with regard to the absorbent capacity of the intestines, and, secondly administer it in a sufficient dose. All the condition will then be present for its action on the organism and the effects of this precious metal will be quickly manifest.

The following formula fulfills these essential conditions

| | | | |
|-----------|----|---|-----|
| | Rx | Iron sulfate | ℥ss |
| | | Potassium subcarbonate | ℥ss |
| Pulverize | | separately, mix slowly and carefully | |
| then add | | Tragacanth mucilage | q.s |
| | | Pound up vigorously and make a mass, divide into 48 pills | |

The dosage was two pills daily for three days, three pills daily for three days, four pills daily for

*Little C. C. The fight on cancer. Public Affairs Pamphlets No. 38. 31 pp. New York: American Society for the Control of Cancer, 1939.

three days, thereafter, twelve pills daily until well. Each pill contained 5 gr (0.3 gm) of iron sulfate. Twelve contained 60 gr (4 gm), a daily dose which compares favorably with that recommended by the most recent advocates of large doses of iron in secondary anemia.

He reported thirty cases

R W B

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

SEPSIS FOLLOWING CESAREAN SECTION FOR PARTIAL SEPARATION OF THE PLACENTA

Mrs. E., a thirty-three year-old primipara at term was sent into the hospital for the purpose of induction on October 27, 1932. Before this was done the patient had soaked two pads with bright red blood and passed some clots.

The family history was non-contributory. The patient had had scarlet fever and measles as a child, the appendix had been removed in 1920 and the operation had been followed by pneumonia. The tonsils had been taken out twice, and the patient had had arthritis in the hands. Curettage and cervical dilatation for sterility had been performed in 1931. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted five days. The last period began January 17, making the expected date of confinement October 24. The pregnancy had been uneventful.

At entry, the uterus was not relaxed and the fetal heart was heard. It was evident that she had a partial separation of the placenta and a cesarean was decided upon. This was performed under nitrous oxide, oxygen and ether anesthesia, and a male child, weighing 8 pounds, 1 ounce, was delivered in good condition.

On October 28, the day following the operation, the afternoon temperature was 102°F and rose during the evening to 104°. The next afternoon it went to 105°F following a chill. On October 30 the morning temperature was 103°F, and the pulse 120. The abdomen was soft, and there was some distention. A medical consultation revealed nothing in the chest. The patient ran an irregular temperature for ten days, ranging from 100 to 104°F in the afternoon. During this time she

drained large amounts of thick, foul smelling lochia. The abdomen was negative, and there was no nausea or vomiting. Although no cultures were taken from the uterus, she undoubtedly had uterine sepsis. Toward the end of the infection a mass developed on the left, almost at the level of the anterior superior spine. She was discharged on November 16, completely well.

When seen on December 8, the mass had entirely disappeared.

Comment. This is a case of uncomplicated uterine sepsis following a clean cesarean section. There was no evidence of peritonitis at the time of operation. The etiology of the infection is unknown as no blood or uterine cultures were taken. The treatment was entirely conservative; the uterus was left alone, and only supportive treatment was administered.

TREASURER'S REPORT

COVERING REFUND DISTRIBUTION

The Treasurer of the Massachusetts Medical Society makes the following report regarding the refund to the district societies for 1940.

The Council voted to distribute the sum of \$5000 to district societies. The total number of payments of annual dues received by the Treasurer by March 4, to be counted for the refund, was 4058. There fore the refund to the district societies for each paid fellow is \$1.232.

The following table gives the number of payments in, and the refund to, each district, as of March 26.

| DISTRICT | NUMBER REPORTED PAID | REFUND |
|-----------------|-------------------------|-----------|
| Barnstable | 47 | 58.00 |
| Berkshire | 109 | 134.29 |
| Bristol North | 56 | 69.10 |
| Bristol South | 159 | 195.89 |
| Essex North | 175 | 215.60 |
| Essex South | 223 | 274.74 |
| Franklin | 39 | 48.18 |
| Hampden | 296 | 364.67 |
| Hampshire | 57 | 70.32 |
| Middlesex East | 109 | 134.29 |
| Middlesex North | 113 | 139.22 |
| Middlesex South | 813 | 1001.62 |
| Norfolk | 721 | 888.27 |
| Norfolk South | 107 | 131.82 |
| Plymouth | 115 | 141.68 |
| Suffolk | 500 | 616.00 |
| Worcester | 341 | 420.11 |
| Worcester North | 78 | 96.20 |
| | 4058 | \$5000.00 |

In 1939 for comparison, the total number of payments for the refund was 3916.

CHARLES S. BUTLER, M.D., *Treasurer*

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 7

BERKSHIRE

Thursday, April 11, at 4 30 p.m., at the Bishop House of Mercy Hospital, Pittsfield. Complications in Obstetrics Illustrated by case histories. Instructor Robert L. DeNormandie. Harry G. Mellen, *Chairman*

BRISTOL SOUTH (Fall River Section)

Tuesday, April 9, at 4 30 p.m., at the Union Hospital, Fall River. Head and Spine Injuries. Instructor Walter R. Wegner. Howard P. Sawyer, *Chairman*

FRANKLIN

Thursday, April 11, at 8 15 p.m., at the Franklin County Hospital, Greenfield. Head and Spine Injuries. Instructor Donald Munro. Halbert G. Stetson, *Chairman*

HAMPDEN

Thursday, April 11, at 4 00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 15 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Gonorrhea in the Female. Instructor Oscar F. Cox, Jr. George L. Schadt, *Chairman*

HAMPSHIRE

Thursday, April 11, at 4 15 p.m., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton. Cardiovascular Disease. Eleven important questions about heart disease and their answers. Instructor R. Earle Glendy. Warren P. Cordes, *Chairman*

MIDDLESEX SOUTH

Tuesday, April 9, at 4 30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Common Problems of Neurology. Indications for lumbar puncture. Instructor H. Houston Merritt. Dudley Merrill, *Chairman*

NORFOLK

Thursday, April 11, at 8 30 p.m., at the Norwood Hospital, Norwood. Common Problems of Neurology. Indications for lumbar puncture. Instructor H. Houston Merritt. Hugo B. C. Riemer, *Chairman*

NORFOLK SOUTH

Monday, April 8, at 8 30 p.m., at the Quincy City Hospital, Quincy. Convulsions in Infants and Children. Etiology and treatment. Instructor R. Cannon Eley. David L. Belding, *Chairman*

PLYMOUTH

Tuesday, April 9, at 4 00 p.m., in the Nurses' Home of the Brockton Hospital, Brockton. Indications for Cesarean Section. Instructor Raymond S. Titus. Walter H. Pulsifer, *Chairman*

SUFFOLK

Thursday, April 11, at 4 30 p.m., in John Ware Hall, Boston Medical Library, 8 Fenway, Boston. Pneumonia. Instructor Maxwell Finland. Reginald Fitz, *Chairman*

DEATHS

BAILEY—GEORGE G. BAILEY, M.D., of Ipswich, died March 30. He was in his seventy-sixth year.

He received his degree from the Harvard Medical School in 1892. Dr. Bailey was a fellow of the Massachusetts Medical Society and the American Medical Association and was a member of the staff of the Cable Memorial Hospital, Ipswich. He had recently resigned his position as medical examiner, which he had held for forty-two years, because of ill health.

His widow, a son, Dr. George G., Jr., and two daughters survive him.

MARSHALL—AUGUSTUS T. MARSHALL, M.D., of Randolph, Vermont, died recently. He was in his sixty-fifth year.

Dr. Marshall received his degree from Dartmouth Medical School in 1901 and was a fellow of the Massachusetts Medical Society and the American Medical Association.

SMITH—FORSTER H. SMITH, M.D., of Lowell, died recently. He was in his sixty-fourth year.

Dr. Smith received his degree in 1902 from the Harvard Medical School. He was former superintendent of the Lowell Isolation Hospital, and a former member of the Massachusetts Medical Society.

His widow and a son survive him.

MISCELLANY

MAINE NEWS

REMOVAL NOTICES

The following removal notices have been received: George W. R. Bowie, M.D., from New Gloucester to Vanceboro.

E. Allen McLean, M.D., from 201 State Street, to 29 Deering Street, Portland.

MAINE MEDICAL ASSOCIATION

The following physicians have been recently admitted to membership in the Maine Medical Association:

Ernest L. Coffin, M.D., Northeast Harbor
Henry Almond, M.D., Gardiner
Wilfred J. Comeau, M.D., Bangor
Paul A. Millington, M.D., Newport
John Valentine, M.D., Dover-Foxcroft
Willis B. Mitchell, M.D., Wiscasset

CORRESPONDENCE

AUSTEN FOX RIGGS

To the Editor—In the *Journal* of March 14, 1940, the death of Austen Fox Riggs of Stockbridge was announced.

I should like to take this opportunity of paying tribute to a physician whose professional career was as striking as the gallant conduct of his life. Dr. Riggs had pre-

pared himself for the practice of internal medicine and had been assistant to Dr. Walter B. James of New York City for three years when conditions of health made it advisable for him to leave New York City and to take up residence in the Berkshires. There for over thirty years and frequently despite personal ill health he devoted himself to his chosen field of work—the treatment of nervous patients burdened with personal difficulties, unable to deal unaided with problems of life. In this task he was peculiarly successful. He gathered around him a group of able young associates, he kept abreast of medical progress, and he considered earnestly the objective appraisal of his work by his medical colleagues. Not satisfied with the mere exercise of his professional skill he carefully analyzed methods and results in the attempt to formulate general principles. Before his death he had the satisfaction of seeing in manuscript form a critical statistical analysis of his life work. Dr. Riggs emphasized the value of his chosen psychotherapeutic methods, and was somewhat impatient with the suggestion that his results depended more on his unusual personal influence than on the special methods he employed. His patients could not but be influenced by his sincerity, sympathy and optimism and by his imposing presence.

As a consultant he was held in high value by colleagues and hospitals. His many interests were indicated by the large number of organizations with which he was affiliated. He inspired a deep affection among an unusual number of friends.

The medical profession has lost a member of unusual value, the community a wise adviser and he leaves his widow and four children a precious memory.

C. MACFIE CAMPBELL.

74 Fenwood Road
Boston.

DONATIONS OF BOOKS AND PERIODICALS

To the Editor: I have had urgent requests for books and periodicals from both China, where the disruption of hospitals and medical schools has made difficult the securing of medical literature, and also from refugees in Mexico who have wholly lost their libraries and their contact with recent literature. If readers of this note should have spare copies of books or periodicals which they would be willing to contribute to either China or Mexico, may I ask that they send them to Miss Anna C. Holt, Librarian Building A, Harvard Medical School. If donors prefer that their gifts be sent to one country or the other they should indicate their preference.

WALTER B. CANNON

25 Shattuck Street
Boston, Mass.

REPORT OF MEETING

GREATER BOSTON MEDICAL SOCIETY

A regular meeting of the Greater Boston Medical Society was held on January 2 at the Beth Israel Hospital. Dr. Max Ruto introduced Dr. Abraham Myerson, who spoke on "Recent Advances in the Treatment of Epilepsy and Schizophrenia."

Dr. Myerson explained that these two seemingly diverse conditions were being considered together because of the suggestive similarity in brain waves and because schizophrenia has recently been treated by the induction of epileptiform convulsions.

The first consideration was epilepsy which was defined as a periodic loss or impairment of consciousness, with or without associated convulsions. In the grand-mal type of seizure there are convulsions, whereas the attacks of petit mal merely result in temporary unconsciousness. An additional type of epilepsy called by Gibbs and Lennox the "psychomotor attack," is characterized by organized motions in the unconscious state.

The speaker cited various factors which appear to influence the incidence of attacks in a susceptible person. Their occurrence during sleep as well as during the periods of falling asleep and awakening has long been observed and has more recently been related to the similarity of the electroencephalographic tracings of the sleeping person and epileptic. The incidence of seizures during organic disease of the central nervous system is greater than can be expected by chance. The fact that drugs such as Metrazol induce convulsions has been the basis of the recent shock treatment of schizophrenia. Hyperventilation and indeed alkalosis of any sort, favors the onset of attacks and the favorable effects of acidosis were the basis of the formerly employed ketogenic diet in the treatment of epilepsy. Further studies serve to indicate that cerebral dehydration and an elevated blood sugar are also beneficial in this condition.

One of the great advances in the study of the mechanism of epilepsy was the introduction by Berger in 1929 of the electroencephalogram, which has subsequently been elaborated and its findings extensively interpreted by Lennox and Gibbs. The latter workers have insisted on the recognition of the underlying paroxysmal cerebral dysrhythmia. They maintain that epilepsy is in reality a chronic disorder with clinical manifestations other than the abnormal electroencephalogram, observed only during periodic "explosions." Similar tracings during sleep show bursts of activity very suggestive of epilepsy and the resemblance of these cerebral dysrhythmias to those of the respiratory system was suggested by Dr. Myerson. Clinical evidence and brain-wave tracings corroborate the fact that voluntary effort, either mental or physical aids in warding off an incipient epileptiform seizure—a fact that most patients soon learn empirically.

Dr. Myerson showed typical electroencephalographic charts of Lennox and Gibbs, which demonstrated the increasing frequency and irregularity of waves during a grand-mal seizure and the characteristic wave and spike of the petit mal attack, coming in bursts in both instances, even in the absence of clinical signs or symptoms. The findings during a psychomotor attack were not considered so constant by Dr. Myerson. Characteristically there is a slow plateau type of wave, which Lennox and Gibbs have found very similar to some tracings in schizophrenic patients. Another well-known observation resulting from the extensive use of electroencephalograms by Gibbs and Lennox was the greater incidence of pathologic wave tracings in relatives of epileptic patients than in the population at large but no exact correlation has been proved to exist between abnormal waves and clinical manifestations of epilepsy.

Dr. Myerson concluded his discussion of epilepsy with a résumé of the development of therapy and an appraisal of its present status. Sedatives had long ago proved their efficacy but the bromides, which were first used produced toxic symptoms when employed in sufficient quantities to minimize the convulsions. Phenobarbital was then used with commendable results, particularly in relatively large doses for grand-mal seizures. Then the researches of Putnam and Merritt showed the phenyl group to be the important constituent of the barbiturates and resulted in the

introduction of the new drug, Dilantin (diphenyl hydantoin). This is largely free of the unpleasant and occasionally dangerous sedative effects of the barbiturates and has proved at least promising in therapy. For the past three years, Dr. Myerson and his collaborators have endeavored to assay the value of various therapeutic agents in the treatment of 150 patients at the Grafton State Hospital. One group has received greatly increased doses of the barbiturates, with stimulants when necessary to allay the sedative effects. Another group received Dilantin, a third group Dilantin and ordinary doses of phenobarbital, while the last group received another new drug, Meborol. The first group showed 65 per cent decrease in number of seizures, while the third group had a reduction of 85 per cent, with the greatest value being exhibited in the grand mal type of seizure. The two newer drugs alone, on the other hand, showed their greatest effect in the petit-mal and psychomotor attacks and were much less prone to cause depressing toxic effects. On the whole, Dr. Myerson concluded that the prognosis for epilepsy was now far from hopeless.

The speaker then continued with a discussion of schizophrenia, pointing out that this condition is now known to have an acute form and may exhibit spontaneous reversals, so that it is not necessarily a chronic and hopeless disease as formerly believed. The facts that Amytal and amphetamine have been demonstrated to cause a temporary remission and that insulin and Metrazol therapy have "produced" remissions of longer or shorter duration serve to indicate that drug therapy may eventually solve the problem. The results so far, however, have failed to attain the success originally predicted.

Dr. Myerson described his "total push" method for helping these unfortunate patients. This was based on the concept that these patients were not aided but rather hindered by the superimposition of a prison psychosis on their fundamental imbalance. Therefore it was decided to interest the patients in physical and mental exercises and to offer praise or blame, reward or punishment, where it was merited. The patients chosen were those who had been sick for over ten years and who had had no remissions. These people have now been treated for more than a year, and although no claims can be made for cures, several patients have improved sufficiently to be released from the institution, for all or part of the time. It was concluded, therefore, that the main problem at present in treating schizophrenia in the absence of a specific drug was to abolish defeatism among the medical profession.

The discussion was inaugurated by Dr. William G. Lennox, who stated that the incidence of abnormal electroencephalograms among essentially normal persons as well as among asymptomatic relatives of epileptic patients had put emphasis on the significance of the fundamental dysrhythmia rather than on the occurrence of seizures. Ten per cent of supposedly normal people exhibit persistent changes in their brain waves, while the incidence in relatives of epileptics is eight times normal. The problem, then, is to determine who are going to have symptomatic manifestations. Dr. Lennox stated that there is probably a change of the arterial carbon dioxide content to an elevated level in grand mal and to a lowered level in petit-mal seizures. The results with Dilantin at the Boston City Hospital have not been so good in petit-mal attacks as have been those of Dr. Myerson, and it was believed that this was the result of better diagnosis which put some of these cases in their true category of psychomotor disturbances where this drug is particularly efficacious.

Dr. H. Houston Merritt discussed, with diagrams, the rationale of the development of the newer phenyl derivatives and expressed the hope that a truly specific drug might be forthcoming.

Dr. Kenneth J. Tillotson emphasized the value of electroencephalogram in mental institutions, particularly in regard to schizophrenia. At the McLean Hospital the 11 worst schizoid patients chosen for Dr. Myerson's total push method have left the hospital, while 8 remaining 9 have shown tremendous improvement. A total of 75 persons so treated, some following unilateral shock therapy, many have left the hospital and a majority have shown immeasurable gain.

Dr. Harry C. Solomon mentioned the American method of treating schizophrenic patients as psychological rather than as organic problems, but said that there was some of each factor playing a role. Although the incidence of abnormal electroencephalographic findings is higher in these people than in the population at large, the fact that some ostensibly normal individuals have abnormal findings than do many schizoid patients leads to any conclusions as to the nature of the condition. The speaker warned that in the appraisal of therapy, one should always be cognizant of the 20 per cent of spontaneous cures with little or no damage. Dr. Solomon concluded by lauding the total push system for enabling schizophrenia to be studied out of any complicating institutional psychosis and for opening the profession to the possibilities of treatment of this disease.

Dr. Wilfred Bloomberg stated that the original conception of schizophrenia included a hopeless prognosis that cures made the diagnosis untenable. He has observed in prisons that long term inmates often develop a condition surprisingly similar to a simple schizophrenia, and they prefer to return to the seclusion of Charlestown Prison rather than to remain at the Norfolk Farm, where forward looking criminologists attempt a regimen like that of Dr. Myerson. Dr. Bloomberg was of the opinion that some schizoid patients, therefore, are better off in prison than they are in being brought to face what they have been fleeing.

NOTICES

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, April 11, at 12 o'clock noon, in the Pathological Amphitheater.

BOSTON LYING IN HOSPITAL

The Journal Club will hold its next meeting in the lecture hall of the Boston Lying in Hospital on Tuesday, April 16, at 8:15 p.m. Dr. Abraham Myerson will discuss "The Heredity of Mental and Nervous Disease: Eugenical Sterilization."

Physicians and students are cordially invited to attend.

HOSPITAL COUNCIL OF BOSTON

The annual meeting of the Hospital Council of Boston will be held at the New England Deaconess Hospital on Tuesday, April 9, at 12:30 noon. Action will be taken on the applications of the Boston Lying in Hospital and Cambridge Hospital for membership.

PROGRAM

Convalescence and the Nursing Home Information Bureau. Miss Carrie M. Hall.

Mr. Frank E. Wing will report on the following:

Should the New England Hospital for Women and Children Increase its Obstetrical Facilities?

Is There Need for Outpatient Facilities at the New England Baptist Hospital?

City Responsibility for Reimbursement for Care of Relief Clients in Voluntary Hospitals, Salaries.

Legislation. Dr Charles F Wilinsky

Members of the medical profession are cordially invited to attend. The charge for luncheon will be 75 cents. Reservations should be made before April 6 (LIB 8515)

BOSTON DOCTORS SYMPHONY ORCHESTRA



The first concert of the Boston Doctors Symphony Orchestra, Alexander Thiede, conductor will be held at 8 15 on Sunday evening, May 5 at Jordan Hall. Tickets are priced at one dollar

and the proceeds will be given to a medical charity. The ticket committee is composed of Dr. Welman B. Christie, chairman, 15 Bay State Road, Boston, Dr. Julius Loman, 1284 Beacon Street, Brookline, and Dr. Robert G. Vance, 262 Beacon Street, Boston.

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday April 16, at 12 o'clock noon. Dr. Edward D. Churchill will speak on "Surgery of the Lungs."

Physicians are cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A research conference of the medical staff of the Peter Bent Brigham Hospital will be held in the amphitheater of the hospital on Tuesday April 9 at 5 00 p.m.

PROGRAM

Experiments with the Miller Abbott Tube and Chemistry of the Jejunal Juices. Drs. Lemuel C. McGee and E. S. Emery Jr.
Observations on the Effect of Salyrgan on Blood Volume. Dr. Reginald Fitz.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday April 10 from 7 to 4 p.m. Drs. E. C. Cutler and Soma Weiss will speak on "The Unconscious Patient."

Physicians and students are cordially invited to attend.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday April 9 in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance) at 8 15 p.m. Dr. Soma Weiss will preside.

PROGRAM

Experimental Observations on the Physiology of Shock. Dr. John G. Gibson, 2nd.
Observations on the Pathology of Shock. Dr. John E. Dunphy.
Clinical Aspects of Shock. Dr. Eugene A. Stead, Jr.
Medical students and physicians are cordially invited to attend.

SIR WILLIAM OSLER HONORARY SOCIETY

The annual lecture of the Sir William Osler Honorary Society of the Tufts College Medical School will be given by Dr. Chester S. Keefer on Friday evening, April 26, at 8 00 in the Beth Israel Hospital Auditorium Boston.

Dr. Keefer will speak on "The Clinical Interpretation of Bacteremia."

MASSACHUSETTS DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

SCHOOL INSPECTOR, BOARD OF HEALTH \$600 A YEAR, EVERETT

Director of State Civil Service, Ulysses J. Lupien has announced that competitive examinations are to be held on April 26 in order to find eligibles for appointment to the position of School Inspector Board of Health Everett.

The entrance requirement is as follows: applicants must be registered physicians under the State Board of Registration in Medicine. The subjects and weights of the examination are as follows: training and experience, 2 practical questions, 3 total, 5. Applicants must obtain a grade of 70 per cent in each subject in order to become eligible. The last date for filing applications is Friday April 12, at 5 00 p.m.

MEDICAL INSPECTOR (MALE) \$700 A YEAR, SPRINGFIELD

Director of State Civil Service, Ulysses J. Lupien has announced that competitive examinations are to be held on May 4 in order to find eligibles for appointment to the above position.

The entrance requirement is as follows: applicants must be registered physicians under the State Board of Registration in Medicine. The subjects and weights of the examination are as follows: training and experience, 2 practical questions, 3 total, 5. Applicants must obtain a grade of 70 per cent in each subject in order to become eligible. The last date for filing applications is Saturday April 20 at 12 o'clock noon.

NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held at the Peter Bent Brigham Hospital on Thursday April 18 at 8 00 p.m. Dr. Hamilton Montgomery a member of the Section on Dermatology Mayo Clinic will speak on the subject "Pathologic Features of Some of the Non-neoplastic Dermatoses."

Physicians and medical students are cordially invited.

NEW ENGLAND DERMATOLOGICAL SOCIETY

The annual meeting of the New England Dermatological Society will be held on Wednesday April 10 at 2 00 p.m., at the Boston City Hospital. At 5 00 p.m., Dr. Alan R. Montz will speak on "Accident, Murder or Suicide?" Following the meeting, dinner and entertainment will be held at the Hotel Kenmore.

NEW ENGLAND OTO-LARYNGOLOGICAL SOCIETY

The regular spring meeting of the New England Otolaryngological Society will be held at the Massachusetts

Eye and Ear Infirmary, 243 Charles Street, Boston, on Wednesday, April 10, at 4 00 p.m.

PROGRAM

- 4 00 p.m. Presentation of hospital cases Dr LeRoy A Schall and infirmary staff
 Acute Surgical Mastoiditis Following Fracture of the Skull Dr Herman Winkler, Providence, Rhode Island
 Bronchial Asthma Due to Bacterial Allergy Dr Warren Kershner, Bath, Maine.
 Osteomyelitis of the Frontal Bone Dr Adolphe Provost, Manchester, New Hampshire.
 Complications of a Parapharyngeal Abscess Dr Louis M Freedman
 Preventing the Chronic Running Ear Dr Harry Goodspeed, Worcester, Massachusetts
 6 30 p.m. Buffet supper
 7 45 p.m. Business meeting
 8 00 p.m. Chemotherapy of Otitis Media. Dr Champ Lyons Discussion Drs Robert N Ganz and Carl H Ernlund

NEW ENGLAND INSTITUTE OF HEALTH

The New England Health Institute will be held in Hartford, Connecticut, the entire week of April 15-19. The headquarters and all lectures will be at Hotel Bond, 320 Asylum Street. Registration will begin Monday morning, April 15, at nine o'clock and will continue through the week. A fee of one dollar will be charged to cover routine expenses.

The lectures will begin at 2 p.m., Monday afternoon, and four lectures will be given simultaneously each hour, from 9 30-12 30, and from 2 00-5 00. Signals will be given five minutes before each hour so that each lecture will close promptly and the next lecture begin on time. Lectures are open to all those who are interested in public health or actively engaged in the work. The various sections and chairmen are as follows:

| SECTION | CHAIRMEN |
|-----------------------|---------------------------|
| Public-Health | |
| Administration | John A. Ferrell, M.D. |
| Preventable Diseases | Wilson G. Smillie, M.D. |
| Sanitary Engineering | Roscoe H. Suttie, C.E. |
| Vital Statistics | Halbert L. Dunn, M.D. |
| Laboratory | Elliott S. Robinson, M.D. |
| Venereal Diseases | R. A. Vonderlehr, M.D. |
| Industrial Hygiene | R. R. Sayers, M.D. |
| Cancer | C. L. Larkin, M.D. |
| Tuberculosis | David R. Lyman, M.D. |
| Child Hygiene | Martha M. Eliot, M.D. |
| Crippled Children | R. C. Hood, M.D. |
| Nutrition | George R. Cowgill, Ph.D. |
| Public-Health Nursing | Mary D. Forbes, R.N. |
| Mental Hygiene | Eugene Kahn, M.D. |
| Health Education | Clair E. Turner, Dr. P.H. |
| Milk, Food and Drugs | E. G. Woodward, A.M. |

On the evening of Tuesday, April 16, a dinner for the faculty of the Institute will be held at Hotel Bond. A minimum charge will be made for this event. This will be the high spot in the program.

Health moving pictures will be shown daily from 5 00-6 00.

Those desiring detailed information should apply to the State Department of Health, Hartford, Connecticut.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The general oral and pathological examinations (Part II for all candidates (Groups A and B) will be conducted at Atlantic City, New Jersey, from Friday, June 7, through Monday, June 10, prior to the opening of the annual meeting of the American Medical Association in New York City on Wednesday, June 12. Formal notice of the exact time and place of the examination will be forwarded to each candidate several weeks in advance of the examination dates. Group A candidates will be examined on June 7 and 8, and Group B candidates on June 9 and 10.

Candidates for re-examination in Part II must make written application to the Secretary's Office before April 1.

The annual dinner of the board will be held in New York City on Wednesday evening, June 12, at the Hotel McAlpin. Diplomates certified at the preceding day's examinations will be introduced personally, and there will be several speakers. All diplomates of the board, and others interested in the work of the board, are cordially invited to attend this dinner.

Tickets at \$3.50 each may be obtained from Dr. Joseph L. Baer, chairman, 104 S. Michigan Avenue, Chicago, Illinois, or at the registration desk during the examinations.

For further information and application blanks, address Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, APRIL 7

TUESDAY APRIL 9

- *9-10 a.m. Studies on Purpura in Relation to the Spleen and Bone Marrow Dr. William Dameshek Joseph H. Pratt Diagnostic Hospital
 *12 30 p.m. Hospital Council of Boston New England Deaconess Hospital
 5 p.m. Research conference of the medical staff Peter Bent Brigham Hospital amphitheater
 *8 15 p.m. Harvard Medical Society Peter Bent Brigham Hospital (Shattuck Street entrance)

WEDNESDAY APRIL 10

- *9-10 a.m. Hospital case presentation Dr. S. J. Thannhauser Joseph H. Pratt Diagnostic Hospital
 12 m. Monthly clinicopathological conference. Boston City Hospital Pathological amphitheater
 2 p.m. New England Dermatological Society Boston City Hospital
 *2-4 p.m. The Unconscious Patient Drs. E. C. Cutler and Som Weiss Peter Bent Brigham Hospital
 4-8 p.m. New England Oto-Laryngological Society Massachusetts Eye and Ear Infirmary 243 Charles Street Boston

THURSDAY APRIL 11

- *9-10 a.m. Diagnostic Errors Dr. H. G. Brugsch Joseph H. Pratt Diagnostic Hospital

FRIDAY APRIL 12

- *9-10 a.m. Prothrombin and Vitamin K Dr. E. L. Lozner Joseph H. Pratt Diagnostic Hospital

SATURDAY APRIL 13

- *9-10 a.m. Hospital case presentation Dr. Thannhauser Joseph H. Pratt Diagnostic Hospital

*Open to the medical profession

- APRIL 5 — William Harvey Society Page 561 issue of March 28.
 APRIL 5 — Chelsea Naval Hospital Page 561 issue of March '38.
 APRIL 11 — Pentucket Association of Physicians. 8 30 p.m. Hotel Barlett Haverhill.
 APRIL 15-17 — American Association for the Study of Gout. Page 211 issue of February 1.
 APRIL 15-19 — New England Health Institute. Page 284 issue of February 15 and notice above.

- APRIL 16—Journal Club meeting. Boston Lying In Hospital. Page 606.
 APRIL 16—South End Medical Club. Page 607.
 APRIL 18—New England Pathological Society. Page 607.
 APRIL 24—Massachusetts Dental Society. Page 365. Issue of February 29.
 APRIL 24-26—Scientific Session. Academy of Physical Medicine. Hotel John Marshall, Richmond, Virginia.
 APRIL 26—Sir William Osler Honorary Society of the Tufts College Medical School. Page 607.
 MAY 10-18—American Scientific Congress. Page 1043. Issue of December 24.
 MAY 13—United States Pharmacopoeial Commission. Page 202. Issue of February 1.
 JUNE 7-8—American Heart Association. Page 469. Issue of March 14.
 JUNE 7-10—American Board of Obstetrics and Gynecology. Page 608.
 JUNE 8 and 10—American Board of Ophthalmology. Page 719. Issue of November 2.
 JUNE 10-14—American Physicians Art Association. Page 332. Issue of February 22.
 JUNE 23-25—Maline Medical Association. Annual meeting. Ranney Lakes.
 OCTOBER 21—American Board of Internal Medicine, Inc. Page 369. Issue of February 29.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MAY 8—Annual meeting. Salem Country Club. Peabody.

FRANKLIN

MAY 14—Franklin County Hospital. Greenfield.

HAMPSHIRE

MAY 14, at 11:30 a.m., at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MAY 15 at 1:15 p.m., at the Unicorn Country Club. Stoughton.

MIDDLESEX NORTH

APRIL 24.

JUNE 31.

OCTOBER 30.

NORFOLK SOUTH

MAY 2.

PLYMOUTH

APRIL 18—State Farm.

MAY 16—Lakerville State Sanatorium, Middleboro.

SUFFOLK

APRIL 24—Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

MAY 2—Censors' meeting. Page 244. Issue of February 8.

WORCESTER

APRIL 10—Worcester Hahnemann Hospital.

MAY 8—Worcester Country Club.

Meetings begin with a dinner at 6:30 p.m. and are followed by business and scientific meetings.

BOOK REVIEWS

Synopsis of Pediatrics. John Zaborsky and T. S. Zahorsky.
 Third edition. 430 pp. St. Louis: C. V. Mosby Co., 1939. \$4.00.

To compress the whole of pediatrics—feeding, growth and hygiene, as well as diseases—into a pocket size volume of 400 pages is no easy task, but the Drs. Zaborsky have succeeded in so doing. Naturally the consideration of particular matters is brought down to the irreducible minimum, but the information furnished though skeletonized, covers all the essential ground. The book is conservative in tone but has been brought entirely up to date. The mere fact that it has passed through three editions in something like six years is proof that it is serving a useful purpose. It should, however, be of more use to the practitioner to whom pediatrics is only an incidental part of practice; the pediatrician has or ought to have most of his material at his fingertips. It may also be recommended

to the medical student who wishes to check up or refresh his memory. As books go it is of excellent value.

Facts and Theories of Psychoanalysis. Ives Hendrick.
 Second edition. 369 pp. New York: Alfred A. Knopf, 1939. \$3.00.

As this excellent survey brings up to date all the new developments in psychoanalysis it is a source of satisfaction that it has now gone into a second revised and enlarged edition. It fulfills the demand due to the increased interest in the scientific aspects of psychoanalysis by psychiatrists and the general medical profession. The book is a basic one and provides an accurate text for a sound understanding of psychoanalysis. The author correctly emphasizes that, in the five years that have elapsed since the appearance of the first edition, there have been no discoveries which have refuted the basic theoretical and practical principles of psychoanalysis.

The volume is divided into four sections: the basic facts of analysis; its theories; analytic therapy and the various medical and other professional applications of the psychoanalytic movement. Among the additions to this revised edition are a discussion of the psychology of female sexuality; recent data on the therapeutic results of psychoanalysis from the Berlin, London and Chicago institutes; an amplification of the previous brief discussion on child analysis; an extended consideration on the psychology of organic disease (psychosomatic reactions); the cultural aspects of psychoanalysis; sections on the systematic training of psychoanalysts as carried out by the various training institutes; suggestions for further reading and a fairly complete glossary of psychoanalytic terms.

There are several features of the volume to which the reviewer would like to call particular attention. The first of these is an account of the two-year investigation of psychoanalysis by a special committee of the British Medical Association subsequently published in the *British Medical Journal*. This special committee concluded that the term "psychoanalysis" can be applied only to the methods and theories evolved by Freud. The section on the recent therapeutic results of psychoanalysis already referred to is of particular interest to the medical profession. Several features are pointed out with which analysts and analytically trained psychiatrists would agree. For instance, cures of symptoms alone are never regarded as significant, the goal of analytic therapy being an adjustment to the problems of life, an adequate strengthening in handling the crippling and suffering symptoms of a neurosis and an increase in capacity of the patient's potentialities.

On the whole, the volume epitomizes the science of psychoanalysis as it is understood today and is therefore of decided value to students, social workers, physicians and psychiatrists.

Psychopathia Sexualis: A medico-forensic study. Richard von Krafft-Ebing. Twelfth edition. 626 pp. New York: Pioneer Publications, Inc., 1939. \$3.00.

This is an inexpensive edition of a standard work on sexual pathology. It is an English translation from the twelfth German edition of 1903 and this translation was first published in 1906. It is now reissued with an introduction and an appendix by Victor Robinson of New York City. The appendix of a little more than eight pages briefly discusses psychoanalysis, endocrinology and the discovery of hormones by Bayliss and Starling and the censorship of sexual literature by the federal authorities. Krafft-Ebing was a pioneer in the field of sexual

pathology and his work went through seventeen editions, the last being issued in Stuttgart in 1924. However, the twelfth edition was the last published from his own manuscript, as he died in 1902, and that edition should be recognized as the authoritative text embodying his latest ideas.

A Textbook of Pathology for Nurses Coleman B Rabin.
Second edition, revised. 260 pp Philadelphia and
London W B Saunders Co., 1939 \$1.75

If we admit that it is desirable for nurses to be subjected to a rather detailed course in pathology and clinical pathology, and if we assume that a good purpose justifies simplification of pathological conceptions, then Dr Rabin has succeeded admirably in fulfilling his purpose. This book follows the plan laid down for the course in pathology given to the students of the Mount Sinai Hospital School of Nursing of New York City. Through twenty-two chapters devoted to pathology the author lays emphasis on the mechanism of disease processes and the correlation of diseased structure with diseased function. Consideration is given the degenerative and inflammatory changes in the body, with special attention to the more important infections, such as tuberculosis and typhoid fever. There is one chapter on ulcers and another on neoplasms. Five chapters are devoted to a consideration of the consequences of obstruction to the viscera. The author has used to good advantage the method originated by MacCallum in the presentation of his material. Four brief well arranged chapters are devoted to clinical pathology. The rather large number of illustrations has been well chosen. In addition diagrammatic representations do much to augment the text.

On the whole the author has not departed from facts in his attempt to simplify the subject. This book should serve as an excellent text for a course in pathology in a nurses' training school.

The Treatment of Rheumatism in General Practice
W S C Copeman Third edition. 276 pp Baltimore
The Williams & Wilkins Co., 1939 \$4.00

The fact that this book is now in its third edition indicates an appeal which your reviewer fails to appreciate. The book is full of traditions, both for diagnosis and treatment, but there is little substantiation. The best explanation for its appeal is that it contains many recommendations for treatment which can be carried out by the general practitioner, though here in New England we should doubt their value. The use of vaccines is recommended, but not justified. Most drugs, except aspirin, are damned with faint praise. Colchicine is not mentioned in the treatment of gout. Atophan and antipyrine are advised, with no mention of their toxicity. Intestinal antiseptics are not recommended, diets are not so simple as they are in the United States, stress is laid on the need of an alkaline ash diet, colonic lavage and medication baths, and spa treatments are given too much prominence. The value of treatment by orthopedists is slighted.

A Textbook of Obstetrics With special reference to nursing care Charles B Reed and Bess I Cooley 476 pp
St. Louis The C V Mosby Co., 1939 \$3.00

For a book which is described as being "brand new," this textbook of obstetrics can hardly be said to be an improvement over the books already published.

The first few chapters, describing anatomy, physiology and embryology, together with that on prenatal care in the normal pregnant woman, are satisfactory. In connection

with many of the complications of pregnancy, however, there are to be found gross errors of commission and omission. In addition, the reviewer could not help noticing many ambiguous statements in which the wording makes the text very difficult to understand. There are many mistakes in spelling throughout the book and these, together with at least one inverted illustration, lead one to infer that the proofreading has been very carelessly done. Consequently, it is difficult to recommend this book.

Teaching for Health Marguerite M. Hussey Second edition 328 pp New York Prentice Hall, Inc., 1939 \$2.25

Miss Hussey is assistant professor of education at New York University, and her work on the relation of teaching to health has required a second edition within a year of its first publication. The book is written from the point of view of the teacher and discusses the factors affecting health which are directly or indirectly controllable by the teacher. Of special interest are the chapters on the relations of the home and parents with the school in the promoting of child health. Under printed materials, standards are set up for evaluating hygienic textbooks. Although the book is primarily a technical manual of methods for promoting the health of the child by the schools, it should prove useful to school physicians and nurses in giving the views of those interested in this type of education.

A Topographic Atlas for X Ray Therapy Ira I. Kaplan and Sidney Rubinfeld 120 pp Chicago The Year Book Publishers, Inc., 1939 \$4.00

This quarto volume consists of fifty five plates, 5 1/4 by 7 inches in size. On the page facing each plate is a concise explanation. The information given by illustrations and text can, of course, be culled from works on topographical anatomy, especially works on surface projections. This volume may serve as a short cut for radiologists or as a guide to technicians. Superficiality is the fellow traveler on all short cuts to fundamental knowledge, this work carries that stigma.

Manual for Diabetic Patients W D Sansum, Alfred E. Koehler and Ruth Bowden. 227 pp New York The Macmillan Co., 1939 \$3.25

The discussion of the nature, diagnosis and dietary treatment of diabetes in this manual is adequate but better suited to the physician than to the patient. In view of the authors' early recommendation of diets containing more liberal quantities of carbohydrate than had previously been used, one naturally turns to their present practice and learns "that we are feeding our adult diabetic patients from 150 to 300 grams and our diabetic children from 100 to 400 grams of carbohydrate daily." Various common complications of diabetes are described and preventive measures recommended. In addition to testing the urine for sugar, it is considered desirable that the patient know how to make the tests for acetone and diacetic acid.

Erratum

In the listing of the book review, *Surgical Applied Anatomy*, by Frederick Treves (*New Eng J Med* 222:334, 1940), the price was given as \$4.00, it should have read \$4.50.

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ACUTE MECHANICAL OBSTRUCTION OF THE SMALL BOWEL*

Its Diagnosis and Treatment

LELANO S. McKITTRICK, M.D.,† AND S. PETER SARRIS, M.D.‡

BOSTON

IN 1908 Scudder¹ reviewed the cases of acute mechanical obstruction of the small bowel operated on at the Massachusetts General Hospital between 1898 and 1907. Richardson² in 1920 and McIver³ in 1932 reviewed comparable series of cases. This, then, is the fourth report from this hospital. Such a series of reports presupposes a continuity of active interest on the part of the visiting and house staffs in the diagnosis and management of this group of cases, and affords an unusual opportunity for the comparison of the results of treatment over a period of forty years.

Strangulation obstruction was early recognized as the greatest factor in the high mortality of these cases, and the teaching of early diagnosis and early operation has been thoroughly instilled into each and every member of the hospital staff throughout the last thirty years. On the other hand, Scudder,¹ Jones,⁴ Richardson,² McIver³ and others have constantly pointed out the need of accepting the hazards of gangrene in certain cases with late obstruction, and of doing a simple drainage of a distended loop of bowel without exploration as a means of relief.

Monks⁵ in 1905 suggested that a distended loop of bowel could be most satisfactorily emptied by threading it on a glass tube. Wangensteen⁶ in 1931 suggested constant suction applied to an inlying stomach or duodenal tube, and reported 3 cases of acute obstruction which were relieved following this procedure. He, probably more than any other one person, is responsible for the development of the nonsurgical decompression of a distended bowel.⁷⁻⁹ The difficulties of decompressing the lower segment of small bowel through a tube in the upper gastrointestinal tract were well recognized by him and others. In 1934, Miller and

Abbott¹⁰ overcame this, and they with Johnston¹¹ and others¹²⁻¹⁴ have given a new impetus to the conservative treatment of these cases by combining the principle of Monks with that of Wangensteen. They have shown conclusively that a long, flexible rubber tube of special design placed in the stomach will pass through the pylorus and work its way down to the obstructing point, emptying the bowel of gas and liquid contents, the collapsed bowel threading itself on the tube as Monks had done at operation.

It is not surprising that many of us in this hospital should view with some alarm these recent enthusiastic reports in favor of a conservative form of treatment, fearing lest much be lost which has been gained by the teaching of early diagnosis and early operation. Therefore, before adopting a method so different in concept from the present teachings, it has seemed imperative to bring the earlier work of Scudder, Richardson and McIver up to date, and to study our more recent cases in an especial endeavor to evaluate, if possible, the results of their teaching, and to clarify more completely in our own minds the indications for early operation as against delayed or nonoperative treatment.

In this review we have not followed exactly the course of our predecessors. We have restricted our cases to definite acute mechanical obstruction of the small bowel occurring in patients with or without previous operation, exclusive of obstruction secondary to external hernia. We have not included obstruction of a plastic nature arising in the course of such a condition as peritonitis, as there is no question but that this type of obstruction is ideally treated by suction, nor have we included cases secondary to obvious carcinoma, or occurring as complications of chronic disease where the obstruction is of secondary importance. There are available for study 136 cases treated during the last fifteen years.

In addition to ascertaining the comparative re-

*From the medical services of the Massachusetts General Hospital, Boston. Presented at the annual meeting of the New England Surgical Society, Boston, Massachusetts, September 29, 1939.

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sults during the last four decades, it was hoped that this study might suggest answers to the following questions: What are the factors from which an early and accurate diagnosis can be made? How important and how frequent is strangulation of the blood supply to the obstructed loop? Can one with reasonable assurance distinguish between simple and early obstruction with strangulation? Is there any distinct time after the development of obstruction when one can safely say that strangulation obstruction will not occur? What factors other than strangulation contribute to the high mortality? Are there any criteria by which one may say that immediate operation is indicated, or that conservative treatment, either as a preliminary or an active form of management, should be undertaken?

DIAGNOSIS

History

Seventy per cent of all the patients in this series had had some previous laparotomy, and if one excludes the infants with intussusception, 80 per cent of all our patients had had a previous abdominal operation. The length of time between the operation and the development of obstruction is of no significance, in 1 case having been thirty-four years. Six per cent of our patients had been operated on for a previous obstruction, and 20 per cent had had symptoms suggestive of previous attacks with spontaneous recovery.

Symptoms

The commonest presenting symptom was pain, being the chief complaint in 98 per cent of our cases. It was usually sudden in onset (80 per cent) and colicky. Though one might well expect small-bowel pain to be at or above the umbilicus, it was described as upper abdominal in 35 per cent of the cases, lower abdominal in 35 per cent, generalized in 20 per cent and in various locations in 10 per cent. The characteristic cramplike pain may, as the obstruction progresses, become steady, and in a few cases it entirely disappeared.

Vomiting was present to some degree in 93 per cent of the cases. In many, however, it was not a prominent symptom, the so-called fecal vomiting that one is accustomed to associate with small-bowel obstruction was a late symptom.

Characteristically there was cessation of either movement of the bowel or passage of gas by rectum following the onset of pain. In 60 per cent of our cases there was nothing passed by rectum after the early symptoms of the obstruction. However, in the remainder of the cases small amounts of gas or feces were frequently passed, particular-

ly after enemas, and in a few the bowels moved well shortly after the onset of the obstruction.

Symptoms may arise at any time in the day or night. Not a few of our patients were awakened from a sound sleep by the onset of their obstructive pain.

Physical Examination

In the early stages of obstruction there is little effect on the general condition of the patient.

As has been pointed out by Donaldson,¹⁵ Morton,¹⁶ Herrin and Meek¹⁷ and others, distention comes late in the course of the disease and should not be awaited for a diagnosis. There was no discernible distention in 40 per cent of our cases.

Tenderness is not a prominent symptom, although in most cases it is present in some degree, particularly in relation to the point of obstruction. In late cases, especially those of strangulation obstruction, tenderness and spasm are usually found. This will be discussed more in detail in the section on the differential diagnosis of simple and strangulation obstruction.

Obstructive peristalsis, elicited with the stethoscope and characterized by periodic high pitched tinkles, often though not always synchronous with colicky pain, was found in 73 per cent of our group. It must be remembered, however, that in the later stages of obstruction the abdomen may frequently be relatively silent, and long periods may elapse between peristaltic noises, which in many cases may be quite faint. Twelve per cent of our patients were described as having normal peristalsis, and it was stated to be absent in 15 per cent.

Laboratory Findings

The temperature is usually normal even after the obstruction has been present for some time, unless strangulation obstruction and resulting peritonitis are present. The pulse in the earlier stages of the disease is normal or only slightly elevated. Even in the early stages there may be no change in the character or rate of the pulse. A rapid pulse in a patient with intestinal obstruction is indicative of a serious complication.

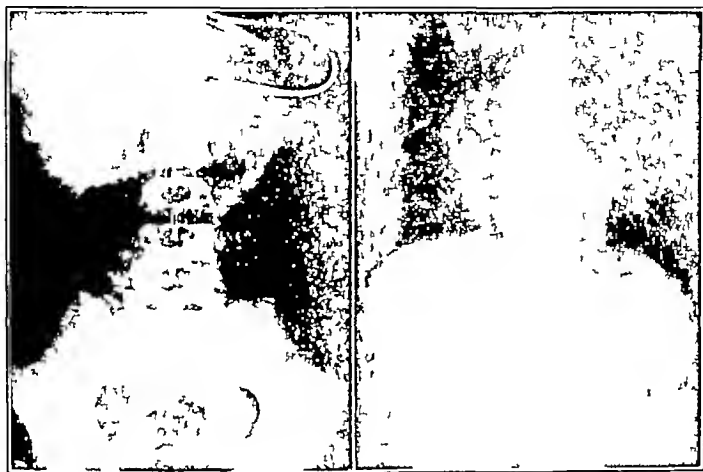
The white-blood-cell count is variable. While most commonly 15,000 or below, it varied from 3000 to 38,000 in our cases. The value of the white-cell count as a differential diagnostic sign of simple and strangulation obstruction will be discussed later.

As regards blood constituents, variations from the normal depend on the duration of obstruction, with consequent dehydration and chloride loss. In early obstruction, alterations are not expected and

are not found, but in late stages the nonprotein nitrogen rises and the chlorides fall. This rise of nonprotein nitrogen caused a mistaken diagnosis in a fatal case in this series, the patient having been judged to be in renal uremia.

The so-called scout x ray film of the abdomen is the most important single objective finding in the patient with small-bowel obstruction. Its significance was first stressed in this country by Case¹⁸ in 1915, but its use did not become prevalent

been emptied of gas and fluid and without the giving of an enema, because of the gas which may be injected into the large bowel and thus confuse the picture. It is not within the province of this paper to go into the details of the x ray findings.¹⁹⁻²³ Suffice it to say that distended coils of small bowel were demonstrated in one of our cases three hours after the onset of symptoms. On the other hand, the characteristic step ladder arrangement (Fig. 2) is found only in the



A

B

FIGURE 1

Scout films in lying (A) and sitting (B) positions showing gas shadows and fluid levels in distended coils of small bowel

until the present decade. Its value as a diagnostic sign cannot be overemphasized, particularly if the surgeon or radiologist has had experience in the interpretation of the plates. Two views are generally taken, the first with the patient supine, and the second in the sitting position. The former position (Fig. 1A) is superior for the study of the gas patterns of the bowel, the latter (Fig. 1B) is better for the determination of fluid levels. It is probably not saying too much to state that a close study of such films in association with a carefully taken clinical history should result in an accurate diagnosis in a very high percentage of cases. In 92 per cent of the cases in this series in which x ray films were taken there was fairly positive evidence of obstruction. In the remaining cases the evidence was suggestive. It is our experience that x ray films should be taken after the stomach has

later stages. Diagnosis should be made, given the opportunity, long before this occurs, just as it should be made before the development of fluid levels. It should be stated, however, that there are times when the x ray picture is most confusing. Small amounts of air may be found scattered through the bowel below an obstruction. In early cases a second film taken after an interval of six or eight hours may be of great help when there is doubt as to the diagnosis or as to the progress of the condition. There are other times when the shadows are such as to be difficult of interpretation. We have seen the small bowel so dilated as to be interpreted as a markedly distended cecum (Fig. 3A). In certain conditions of this type the giving of a small amount of barium by rectum may entirely clarify the picture with little or no risk to the patient (Fig. 3B).

We cannot agree with Wangensteen⁹ that dilatation of the small bowel is rarely seen in cases of



FIGURE 2 *Characteristic Step-Ladder Arrangement in Late Small-Bowel Obstruction*

obstruction of the large bowel. We have repeatedly seen it in such cases, even when the lesion was as low as the sigmoid (Fig. 4)

chanical obstruction of the small bowel are these: a history of sudden and usually severe abdominal pain, colicky in nature, particularly in a patient with previous laparotomy, vomiting, usually following the pain, which may be small in amount or in the later stages copious and fecal, evidence of one or more distended loops of small bowel, as shown by a scout x-ray film of the abdomen, and active, high-pitched, tinkling peristalsis, audible over the abdomen.

Simple Versus Strangulation Obstruction

The importance of the recognition of early strangulation obstruction cannot be overemphasized. Wangensteen^{8, 9} believes that the experienced observer can accurately distinguish between obstruction which is simple in character and that with early interference with the blood supply to the obstructed loop. He places strong emphasis on the presence or development and extension of abdominal tenderness and spasm in a case where the findings are those of acute obstruction. The suggestion of a mass felt through the abdominal wall or on pelvic or rectal examination is in his judgment confirmatory evidence of a strangulation obstruction. Recognizing our own inability in the past to make this differential diagnosis, we have carefully studied these cases with this in mind.

Pain in strangulation obstruction may be more



A

B

FIGURE 3

In A, the large gas shadow in the right abdomen was interpreted as cecum. In B, taken after a barium enema, the unrotated cecum is seen on the left. The distended coil on the right is small bowel.

In summary, then, we may say that the five important early diagnostic criteria in acute me-

abrupt in onset and more severe, and is more apt to be quite steady with exacerbations or to change

from colicky to steady with the onset of strangulation. In fact, in 5 of our cases the onset was so sudden and the associated tenderness and spasm so marked that a diagnosis of perforated viscus was made.

Gangrene may develop very quickly. The nature of the obstruction may be such as to strangle the supply to the obstructed loop in the early minutes of the process. One of our patients who entered the hospital three hours after the onset of pain, and who was promptly operated on after the usual emergency ward routine of diagnosis and preparation, showed at operation a gangrenous



FIGURE 4. Distended Loops of Small Bowel Secondary to Obstruction of the Sigmoid from Carcinoma.

segment of bowel that required resection. Moreover, the transition from simple to acute strangulation obstruction may occur with little or no warning in a patient under observation, and this transition may happen as well between 7 p.m. and 7 a.m. as during the hours of more careful observation. It has been suggested that if forty-eight to seventy-two hours have passed with no sign of strangulation having been elicited, the chances are that there is or will be no strangulation. Half of our patients with strangulation obstruction requiring resection were operated on following a delay of six hours up to several days after an admission history of obstruction of three or more days' duration. This we feel justified in interpreting as evidence that a diagnosis of strangulation

obstruction could not have been, and from the record was not, made at the time of admission, and yet resection of a strangulated loop of bowel was later necessary. We may assume, therefore, that the interval that has elapsed between the onset of symptoms and the arrival of the patient at the hospital, even though it exceeds seventy-two hours, cannot be safely taken as evidence against the subsequent development of a strangulation requiring resection.

It has been our impression that an elevation of the white-cell count above 18,000 is strongly suggestive of an interference with the blood supply to the segment of obstructed bowel. A study of the counts in these cases, however, does not confirm this. Although 35 per cent of the patients with suspected strangulation obstruction had white-cell counts of 20,000 or more, 32 per cent of this subgroup showed no evidence of strangulation at operation and interestingly enough, the highest count in the series, 38,000, occurred in a case of simple obstruction. Even though 50 per cent of the patients with simple obstruction had white-cell counts of 15,000 or less, so many of the cases requiring resection had counts between 3000 and 15,000 that relatively little help may be expected from the leukocytic count. In spite of what has been said, we believe that a rising white-cell count should be interpreted as suggesting strangulation of the obstructed loop.

As previously suggested, a rapid pulse suggests a serious complication in a patient with intestinal obstruction. With but few exceptions, patients requiring resection had a preoperative pulse of 100 or above. On the other hand it is of even greater significance that in the early stages of strangulation, before its toxic effects are manifest, the pulse will not be altered, and therefore the evidence of elevated pulse can be taken as evidence only of late strangulation and is of no diagnostic value in differentiation in the earlier stages.

Tenderness, as pointed out by Wangenstein⁸ is of the greatest significance. On the other hand, as he also points out, there will be localized tenderness over the point of obstruction if this is at such a place that the examining fingers can exert direct pressure over it. Therefore, except in the hands of the most experienced surgeons we do not believe that this is a safe criterion to follow, unless one assumes that any tenderness in a patient with a diagnosis of intestinal obstruction, be it localized or spreading, is to be taken as evidence of strangulation and immediate operation advised. We can therefore only conclude from our own experience and from a thorough review of these records that we ourselves are not able, and those surgeons at the Massachusetts General Hospital under

whose care these patients have been were not able, with any high degree of accuracy, to differentiate the early stages of strangulation and simple intestinal obstruction

Mechanism of Obstruction

It has been our impression that acute small-bowel obstruction of the type under discussion usually occurred at a single point and was most frequently caused by a band arising from previous operation or by a point of adhesion, secondary either to trauma at previous operation or to some pre-existing disease (Table 1) Under single-point ob-

TABLE 1 Mechanism of Obstruction

| CAUSE OF OBSTRUCTION | CASES WITH PREVIOUS OPERATION | CASES WITHOUT PREVIOUS OPERATION | TOTAL |
|----------------------|-------------------------------|----------------------------------|-------|
| Band | 48 | 7 | 55 |
| Adhesions | 17 | 5 | 22 |
| Intussusception | 1 | 17 | 18 |
| Volvulus | 8 | 4 | 12 |
| Foreign body | 2 | 5 | 7 |
| Internal hernia | 2 | 0 | 2 |
| Not stated | 16 | 4 | 20 |
| Totals | 94 | 42 | 136 |

struction we include that secondary to a Meckel's diverticulum, to intussusception or to a foreign body within the lumen of bowel A review of these cases seems to substantiate this belief, since 81 per cent of the total number of cases had some single point, the release of which was adequate to relieve the obstructing mechanism This is of no little importance in considering the management of these cases A single-point obstruction more completely predisposes the development of gangrene of a segment of bowel than is the case where the obstruction is more adhesive and where longer segments of the bowel are involved Moreover, the release of such an obstruction is an extremely simple surgical procedure, and if it is done under conditions which are reasonably favorable and at a time before complications have developed, can be accomplished at very small risk to the patient

RESULTS

One hundred and thirty-six cases fulfilled the selection basis outlined above Eight patients were never operated on because of early recovery, either spontaneously or under conservative treatment There was no x-ray diagnosis to be found in the records of these cases, but the clinical evidence of obstruction was strong

Twenty-seven of the 136 patients died, a hospital mortality of 20 per cent Four of these deaths were in patients not operated on One occurred soon after admission, the patient, already in rather

poor condition, vomited a tremendous amount of foul gastric residue, and during passage of a stomach tube aspirated some of the fluid and died. The other 3 deaths that occurred without operation were from strangulation obstruction because the diagnosis was made too late or not at all. Twenty-three (18 per cent) of the 124 patients operated on had a fatal termination The vital facts relative to the fatal cases are given in Table 2 We shall now attempt to analyze the contributing factors

Age

The average age of our patients was thirty-three. The average age of those who recovered following operation, however, was twenty-eight, whereas that for the fatal cases was fifty-three It is strongly suggested that obstruction in the aged should be managed differently from that in the young or middle-aged, and if one studies Table 3 one can-

TABLE 3 Relation Between Age and Mortality

| AGE | NO OF CASES | NO OF DEATHS | MORTALITY RATE % |
|-----------------------|-------------|--------------|------------------|
| All patients | 136 | 27 | 20 |
| Under 60 years | 114 | 13 | 11 |
| Sixty years or over | 22 | 14 | 64 |
| Seventy years or over | 8 | 6 | 75 |

not but be impressed with the fact that 14 (64 per cent) of the 22 patients sixty years of age or over died, whereas only 13 (11 per cent) of the 114 patients under sixty did so While the number of cases is too small to be conclusive, it seems significant that 75 per cent of the 8 patients seventy years of age or over died following operation There were, of course, other factors, but when one faces a mortality of 64 per cent in any given group, one should seriously consider some change in the form of therapy used

Previous Operation

McIver,³ among others, has remarked that the mortality of patients with mechanical obstruction who have not been previously operated on is sig-

TABLE 4 Data on Fatal Cases in Relation to Previous Laparotomy

| DATA | CASES WITH PREVIOUS OPERATION | CASES WITHOUT PREVIOUS OPERATION |
|--------------------------------------|-------------------------------|----------------------------------|
| Mortality | 15% | 37% |
| Average age | 28 yr | 49 yr |
| Average delay of operation in deaths | 1.3 days | 3.2 days |
| Average duration of obstruction | 2.2 days | 4.0 days |
| Delayed operation | 46% | 65% |

nificantly higher than that of patients who have been This is borne out in our own series, as evidenced by a mortality of 37 per cent in those cases without previous operation, as compared to 15

TABLE 2. Data on Fatal Cases

| HOSEI AL. No. | AGE | PERIOD OF ONSET | DELAY OF OPERATION (MORE THAN 6 HOURS) | TYPE OF OBSTRUCTING LESION | STANDARD LITON DISTENSION | TYPE OF OPERATION | CAUSE OF DEATH | PERMANENT IMPROVEMENT IN N. OPERATION POST-ADMISSION SURVIVAL |
|---------------|-------|-----------------|--|----------------------------|---------------------------|---------------------------------------|---|---|
| 37 | | | | | | | | |
| 127478 | 32 | Yes | 5 days | Band | No | Lysis of adhesions | Uremic bronchopneumonia | 6 days |
| 170187 | 57 | Yes | 1 day | Band | No | Lysis | Massive pulmonary collapse | 2 days |
| 270977 | 73 | None | 5 days | Band | No | Ileostomy | Peritonitis | 1 day |
| 271350 | 85 | None | 7 days | ? | ? | Ileostomy | Brochopneumonia (?) Peritonitis | 2 days |
| 57785 | 62 | Yes | 4 days | ? | ? | Ileostomy | Peritonitis | 15 days |
| 323348 | 65 | None | 9 days | Enterolith | No | Ileostomy | Peritonitis | 1 day |
| 251420 | 23 | Yes | 1 day | Band | Yes | Lysis and ileostomy | Peritonitis (?) | 4 days |
| 325062 | 77 | No | 7 days | Enterolith | N | Mineral and ileostomy | Peritonitis; cardiac hypertrophy; early brochopneumonia | 1 day |
| 309543 | 80 | No | 1 day | Enterolith | No | Removal | Coma; uremia | 1 day |
| 310627 | 61 | Yes | 5 days | Band | Yes | Lysis and nature of ascitic intestine | Brochopneumonia | 5 days |
| 304080 | 37 | None | 10 days | Consentual asc (?) | N | En gastrostomy | Peritonitis (?) peliosis 7 embolus (?) | 2 day |
| 334010 | 59 | Yes | 1 day | Volvulus | N | Lysis and enterostomy | Peritonitis* | 19 days |
| 57222 | 50 | Yes | 14 days | Adhesions | Yes | Resection anastomosis and ileostomy | Peritonitis | 15 days |
| 252579 | 41 | Yes | 3 days | Volvulus | Yes | Resection | Peritonitis | 2 days |
| 246189 | 16 | No | 1 day | Volvulus | Yes | Reduction and ileostomy | "Block" | 1 day |
| 271397 | 60 | Yes | 1 day | Band | Yes | Resection and ileostomy | Brochopneumonia peritonitis (?) | 3 days |
| 263600 | 61 | None | 1½ days | Band | Yes | Resection ileostomy and ileostomy | Peritonitis | 30 min |
| 161634 | 65 | None | 2 days | Volvulus | Yes | Resection and anastomosis | Peritonitis* | 1 day |
| 330030 | 72 | Yes | 2 days | Band | Yes | Resection and ileostomy | Peritonitis; brochopneumonia | 3 days |
| 111597 | 90 | Yes | 4 days | Band | Yes | Resection and anastomosis | Peritonitis; major wound sepsis | 7 days |
| 97046 | 6 mo. | None | 1½ days | 1 intussusception | Yes | Resection and anastomosis | Block | 1 hr |
| 230469 | 6 mo. | None | 2½ days | 1 intussusception | Yes | Resection and anastomosis | Peritonitis (?) | 1 day |
| 307931 | 39 | Yes | 1½ day | Volvulus with peritonitis | Yes | Resection | Peritonitis; gas bacillus septicemia | 1 day |
| 30518 | 62 | None | 1 day | N operation | Yes | None | Peritonitis from gangrenous jejunum | 1 day |
| 272335 | 64 | None | 3 days | Volvulus | Yes | None | Volvulus; intakes; hemorrhage* | 6 or more hr |
| 305438 | 46 | Yes | 4 days | Volvulus | Yes | None | Volvulus; gangrene of small bowel | 2 days |
| 265061 | 53 | Yes | 2 days | Adhesions | N | None | Aspiration of omilus | Dead on admission |

Autopsy

per cent in those with a previous laparotomy (Table 4)

The nature of the obstruction in these patients (Table 1) may well not be the significant factor in this increased mortality. A study of these cases (Table 4) shows that in the fatal cases not previously operated on the patients were on the average twenty-one years older than those with previous operation, furthermore, treatment had been delayed on an average of two days more after hospitalization, and the duration of obstruction had been almost twice as great. This delay in diagnosis is probably partly due to the fact that surgeons have been trained to consider that any attack of abdominal pain in the presence of an abdominal scar means acute small-bowel obstruction until proved otherwise, we therefore undoubtedly think in terms of obstruction in the patient with a previous operation, whereas the absence of any etiologic factor in the patient without previous operation renders less likely the careful consideration of acute small-bowel obstruction as the cause of symptoms. This is particularly so in the older group of patients.

Duration of Obstruction

There has been uniform agreement that the duration of obstruction plays a leading role in the mortality,^{16, 24-27} and this was shown even more strikingly than we had expected in the group of patients under discussion here. Forty-three patients were operated on within twenty-four hours of the onset of obstruction, and in this group there were no deaths. There would then seem to be no question but that any patient in whose case a diagnosis of small-bowel obstruction is made or even strongly suspected within the first twenty-four hours after onset can be operated on with great safety, and can and should be operated on immediately.

It may be of significance, however, that after twenty-four hours the additional delay does not seem to carry with it a much higher mortality. This important element of time affects other factors, such as the type of operation required, and will therefore be discussed further.

Type of Operation

It is undoubtedly not so much the magnitude of the operation that is responsible for the higher mortality where more extensive operations are required, as the advanced stage of the disease and the associated complications, such as peritonitis, known to accompany it. It is therefore interesting to note that those cases operated on sufficiently early, or under conditions permitting the simple lysis of a band or adhesive point,

showed an extremely low mortality (3 per cent). On the other hand, those cases in which strangulation obstruction had occurred, requiring resection of a segment of bowel, had the highest mortality (52 per cent). Again, one sees that important factor, time, and the prominent part it plays in the type of operation in cases of acute small-bowel obstruction.

TABLE 5 Effect of Duration of Symptoms on the Type of Operation

| INTERVAL BETWEEN ONSET AND OPERATION | TYPE OF OPERATION | | |
|--------------------------------------|--------------------|-------------------------------------|-----------|
| | LYSIS OF ADHESIONS | ILEOSTOMY OR SIDETRACKING OPERATION | RESECTION |
| | % | % | % |
| Twenty four hours or less | 93 | 5 | 2 |
| Twenty five to 48 hours, inclusive | 64 | 8 | 28 |
| More than 48 hours | 33 | 41 | 23 |

A patient operated on within the first twenty-four hours after onset of obstruction has nine chances out of ten of requiring a simple lysis of a point of adhesion (Table 5). In the second twenty-four hours his chances are only six out of ten that a simple operation will suffice, and after forty-eight hours have elapsed they are only three out of ten.

Hospital Delay

One should probably distinguish between the delay due to the patient's late arrival and that due to the inability of the surgeon to make the diagnosis, or deliberately accepted in the management of the patient. We have gone over these cases with this in mind, and have considered a delayed operation as one which was postponed six or more hours after admission (Table 6). This

TABLE 6 Effect of Hospital Delay on Mortality

| INTERVAL BETWEEN ONSET OF OBSTRUCTION AND ADMISSION | NO DELAY | | | DELAY (6 HOURS OR MORE) | | |
|---|-------------|--------------|-------------|-------------------------|--------------|-------------|
| | NO OF CASES | NO OF DEATHS | MORTALITY % | NO OF CASES* | NO OF DEATHS | MORTALITY % |
| | | | | | | |
| Twenty four hours or less | 42 | 0 | — | 17 | 5 | 29 |
| Twenty five to 48 hours inclusive | 12 | 3 | 25 | 12 | 3 | 25 |
| More than 48 hours | 18 | 6 | 33 | 23 | 6 | 26 |
| Totals | 72 | 9 | | 52 | 14 | |
| Averages | | | 12 | | | 27 |

*We have omitted 3 fatal cases of strangulation obstruction in which the patients were not operated on because when diagnosis was made after a delay it was too late. We have also omitted 8 patients who recovered without operation. This is to facilitate the comparison of operative statistics in cases of delay and no delay as it happens this does not affect the mortality statistics.

delay has occurred either because of failure to make the diagnosis, or because the surgeon in charge was under the impression that the patient was improving either spontaneously or with suction, and that operation was therefore unnecessary. As a

matter of fact, almost without exception any case in which there was a delay of six hours or more had elapsed. The average hospital delay in this series was two days.

A study of these cases would seem to be essential to the formulation of proper management in the future. Forty-two patients admitted to the hospital within twenty-four hours of onset of symptoms were operated on immediately, with no deaths, whereas 5 (29 per cent) of 17 patients who entered the hospital within twenty-four hours of the onset of symptoms, but for one reason or another were not operated on as emergencies, died. However, one sees in the second twenty-four hours a mortality that is about the same with or without delay, whereas after forty-eight hours had elapsed the gross mortality of the 23 patients where operation was delayed was smaller than that in the 18 cases where immediate operation was done. It would therefore seem justifiable to conclude, regardless of other factors, that immediate operation should be done when one sees a patient less than twenty-four hours after the onset of symptoms, that early operation may be done in the second twenty-four hours, but that after forty-eight hours have elapsed immediate operation should not be undertaken.

Strangulation

There seems to be no question in anyone's mind that the most serious complication in the type of obstruction under discussion is the strangulation of the circulation to the loop of obstructed bowel. There is, however, a slight difference of opinion as to the accuracy with which early diagnosis can be made in this complication, as to how frequently it occurs and as to what part it plays in the total mortality in cases of obstruction.

We have already considered the differential diagnosis between simple and strangulation obstruction, and are forced to admit that in our hands a differential diagnosis can be made with reasonable accuracy only in the later cases. Strangulation obstruction occurred in 33 per cent of all our cases. A comparison with the cases of the previous decade, as reviewed by McIver,³ shows that this is a distinct drop from the figure of 50 per cent in a comparable group of cases. That it is the most important factor in the fatal outcome is evidenced in our own cases by the fact that 16 of the 27 deaths were referable to gangrene. Thus 59 per cent of the fatalities were the result of interference with the blood supply to the involved loop. This is comparable to Wangenstein's⁴ series (excluding hernia), where 60 per cent of the

deaths classified as related to obstruction were due to gangrene.

Comparison of the Results by Decades

We believe it to be of no little importance to compare the results reported from this hospital in the three preceding decades with those in the last ten years (Fig 5*). We see a striking drop

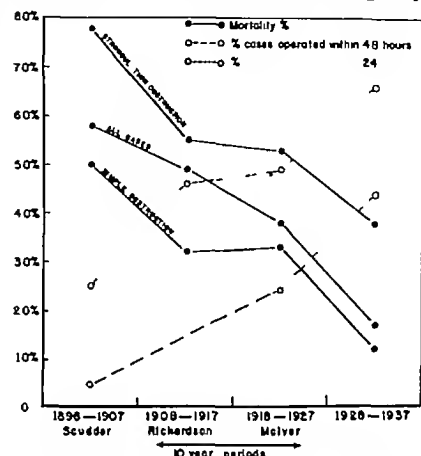


FIGURE 5

The graph shows clearly the progressive decrease in mortality over a forty-year period. The greatest drop has been in the last decade. This decrease has come simultaneously with the increase in the proportion of cases operated on within forty-eight and particularly twenty-four hours of the onset of symptoms.

in mortality in the cases of both simple and strangulation obstruction. Many factors contribute to this marked and progressive improvement. However, it would seem justifiable to suggest the following:

The results of improved surgical treatment are reflected more in the cases of simple than in those of strangulation obstruction.

The increase (20 per cent in the last decade) in the number of patients operated on within twenty-four hours after the onset of symptoms is reflected in the lower mortality among the cases with strangulation obstruction.

The most productive group for further improvement is that with strangulation obstruction and inasmuch as most of these patients die of peritonitis secondary to the pathologic process rather than to any technical surgical error, earlier diagnosis and operation before gangrene and peritonitis have ensued would seem indicated.

*Figure 5 reports the mortality of ten-year period immediately after McIver's report. All other statistics and tables refer to fifteen-year period (July 1, 1924 to July 1, 1939).

Any method of treatment that tends to delay operation in patients entering the hospital within twenty-four hours of the onset of symptoms may be followed by an increase rather than a decrease in mortality

CONCLUSIONS

In beginning this study it was our hope that certain vital questions in relation to the diagnosis and management of this group of cases might be clarified. We feel warranted at this time in answering these questions as follows

In addition to a careful history-taking and physical examination, the routine use of the scout film of the abdomen should make possible a definite diagnosis of early acute obstruction of the small bowel in a high percentage of cases

Strangulation is the most important single factor in determining the outcome of a case of acute small-bowel obstruction. It was present in 33 per cent of the total group, and was the cause of death in more than half the fatal cases

Regardless of Wangensteen's conviction that a differential diagnosis can be made of early strangulation and simple obstruction, we are forced to conclude that we ourselves were unable to make this differential diagnosis in early cases, and that certainly it was not made early enough to prevent resection in a substantial proportion of the cases reviewed by us

There is no definite period beyond which one can say that strangulation obstruction will not occur. One can say that it may occur within four hours of the onset of symptoms, that operation done within the first twenty-four hours is almost certain of success regardless of the presence or absence of strangulation, and that after forty-eight hours have elapsed while the danger still exists, the advantages of delay probably outweigh the risk of strangulation

Certain factors other than strangulation contribute to the high mortality. Though these are varied, the strongest ones are age and the duration of the obstruction. In addition the presence of distention of the small bowel at operation presents a mechanical difficulty which has been a factor in 30 per cent of the deaths in this series. One can therefore add to the triad of gangrene, age and duration, suggested by McIver,³ the mechanical factor of distention

The one positive essential for operation is that the patient present himself for treatment within the first twenty-four hours after the onset of symptoms. It seems doubtful from a review of these cases that any complication relative to the obstruction itself would justify delay of more than a

few hours in the preparation of such a patient for operation. Almost certainly any such factors—shock, rapid pulse, tenderness and distention—would be the result of strangulation obstruction, and immediate operation at the earliest possible time would be imperative. After twenty-four hours have elapsed, other factors such as distention, dehydration and chemical imbalance rapidly assume importance equal to or surpassing the risk of strangulation. Therefore, in cases where the obstruction is of twenty-four hours' duration or longer, delayed treatment would seem indicated in any patient sixty years of age or older unless there is definite evidence of strangulation obstruction

RECOMMENDATIONS FOR TREATMENT

There is probably no condition in which the results to be obtained depend so much on experience, judgment and individual treatment as that in cases of acute mechanical obstruction of the small bowel. However, in view of the above findings, and judging from the experiences of Wangensteen,⁸⁻⁹ Miller, Abbott and Johnston¹⁰⁻¹⁴ and others, as well as from our own, we feel justified in suggesting the following principles for the management of such cases

The degree of dehydration and chemical imbalance should be evaluated and appropriate methods instituted for relief, with observance of the necessity of transfusions for certain patients with strangulation obstruction.²⁸⁻²⁹

A double-lumen Miller-Abbott or similar tube should be passed immediately, to be left down whether or not operation is undertaken

Immediate operation is indicated in any case examined within twenty-four hours after the onset of symptoms. We see no place for conservative treatment in this group

Early operation should be done on a patient seen in the second twenty-four hours after onset

Delayed or nonoperative treatment is indicated in the absence of definite signs of strangulation obstruction in any patient seen later than forty-eight hours after the onset of symptoms, or in any patient over sixty years of age, unless the obstruction is of less than twenty-four hours' duration and the patient is in good condition, without distention

If conservative treatment is instituted, the following routine should be followed: serial abdominal films at twelve-hour to twenty-four hour intervals, in order to follow the progress of the tube and the degree of distention, bi-daily white-cell counts*, and frequent abdominal ex-

*Even though normal or low white cell counts do not exclude strangulation, we think that a rising count should be accepted as evidence of increasing interference with the blood supply of the involved segment of bowel.

amination, at least every four or six hours, with the examiner particularly alert for the development of point or rebound tenderness.

If decompression cannot be accomplished by intubation, and laparotomy under general or spinal anesthesia seems too hazardous, the distended bowel should be drained by inserting a catheter in a distended loop under novocain anesthesia. No attempt at exploration should be made at this time.

If decompression is successfully accomplished and normal bowel action re-established, it is our belief that for a good risk patient an operation of election at the same hospital admission should be given serious consideration. We believe that since the obstructing mechanism is probably still present, and since 26 per cent of our patients have given a history of previous attacks, the risk of lysis of the point of obstruction is less than that of future obstruction, unless the patient is assured of competent surgical care within the first twenty-four hours of any subsequent attack.

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DISCUSSION

DR. RICHARD THOMPSON, Boston. I brought with me one of the Miller Abbott tubes and will speak briefly of how we use it. It has a very thin balloon at the end. The up beyond this balloon is metal and perforated, and is connected with one of the lumens that run throughout the whole ten feet. The other lumen goes to the inside of the balloon. The balloon can be inflated and held inflated by the clamping off of the other limb at the proximal end. We lubricate the balloon with surgical lubricant because oil or grease will injure the rubber and pass it through the nose to get it into the stomach. The technique of getting it beyond the pylorus is sometimes quite troublesome, and we have had some experiences which have helped us to learn how it may be worked through.

Of course x-ray examination by using the fluoroscope or a flat plate if the patient is too ill to be moved to the x-ray department, is of great value. If one is in extreme haste to get the tube down fluoroscopy is very important; however, if for any reason one wishes to use the tube for purely diagnostic purposes or does not feel anxious to get it down immediately because the obstruction is subacute the patient may simply lie in bed in any position, not necessarily on the right side, and take cold preferably ice cold fluids by mouth. If the tube is given a little urging through the nose, it will usually pass the pylorus.

Of course, as Dr. McKittick said, the ideal place for the use of this tube is in early postoperative obstruction when the condition is due to plastic exudate about the bowel and when one feels perfectly sure that there is no constricting band that may cause gangrene of a loop. After the tube has been passed in such cases, recovery is made easier because we can give fluids, and even milk and soft solids, at a much earlier time than we should dare to without the safety valve effect of the tube in the small bowel.

Certain patients who obviously have something wrong in the small intestine, perhaps regional enteritis, can be very effectively diagnosed with the Miller Abbott tube.

DR. S. PETER SARRIS, Boston. There is one aspect of the treatment of acute mechanical obstruction of the small bowel that Dr. McKittick did not mention that is the use of 95 per cent oxygen in relieving distention. This method, which was introduced by Dr. Jacob Fine, of Boston, is based on sound physiological principles. The first is the observation by Meier that the chief component of gas in the distended small bowel is nitrogen. The second principle is that gases diffuse through a semipermeable

membrane in proportion to their partial pressure. Dr. Fine therefore administered 95 per cent oxygen, which washes the nitrogen first out of the lungs and then out of the blood stream. Finally there begins a diffusion of nitrogen from the intestines into the blood stream. As a result, distention is diminished within twenty-four hours in about 60 per cent of such cases.

We have not used this method extensively, but have seen encouraging results from it. We suggest that its outstanding value lies in supplementing the treatments outlined by Dr. McKittrick. Whether one is going to operate or to use the Miller Abbott tube, no harm will come from putting the patient in a 95 per cent oxygen tent, if he is badly distended.

I wish to say a word about the difficulties we have had with the Miller Abbott tube. We do not profess to be experts, but there is one thing that we have learned, and which the originators of the tube themselves admit. That is that in about 15 per cent of cases it is impossible to get it through the pylorus. Another thing we have discovered is that these tubes need extremely careful attention if they are to function properly.

A complication in small bowel obstruction is knotting of the tube. This is probably extremely rare, but it certainly occurred in one case. The tube was passed, but shortly thereafter drainage ceased. Accordingly the tube was pulled out, and as the end of it reached the pharynx the patient choked and almost died of asphyxia. Quick thinking on the part of the assistant who was drawing out the tube led him to puncture the balloon, and so allow the tube to be extricated. Apparently the tube had become knotted, and this prevented not only aspiration of the small bowel contents but also deflation of the balloon.

DR IRVING J. WALKER, Boston. I should like to mention two rather interesting experiences with the Miller Abbott tube. The first was a knotting of the tube in the stomach. After the tube was passed the patient was x-rayed to determine its position. One film showed what was apparently a knotting. This did not worry us much, the tube was withdrawn into the mouth, the knot was untied and the tube was passed into the stomach again.

The second incident was rather distressing. As you know, the Miller-Abbott tube is a two-way affair, one tube leading to the balloon, and the other projecting through and beyond the balloon. The connecting tips of the metal yoke do not indicate to which tube each leads. It seems to me that the manufacturer could indicate the tip leading to the tube that is to be used for inflating the bal-

loon, and thus aid in avoiding embarrassing situations like the one that occurred in the following case. The patient was thought to have small bowel obstruction, due to bands following a previous appendectomy. A flat plate of the abdomen showed no fluid levels. We decided to pass the tube, and did so. Eighteen hours later the balloon was well down and the small bowel was decompressed. We later operated and found an obstructive band in the ileum which we divided. The tube was left in place for further decompression. After this had been accomplished, we resolved to feed the patient through the tube projecting beyond the balloon. Apparently the nurse tried to use the tube leading to the balloon. She soon realized that the food was not entering the bowel, and therefore shifted to the other tube. The feeding was carried out for two days, at the end of which time it was decided to remove the tube. This I undertook to do. The tube seemed to come out rather harder than usual. However, I gradually worked it up farther and farther. I then became suspicious that the balloon was not deflated and was in the stomach. I then tried to pass fluids through the tube leading to the balloon, but was unsuccessful. Another attempt at withdrawal was made, but again resistance was encountered at the cardiac end of the stomach. After considerable pulling the balloon exploded within the stomach and the tube was easily withdrawn. Later it was discovered that the tube leading to the balloon had become plugged with the feeding material. The incident worried me considerably, especially at the time traction was being placed on the balloon when it had reached the cardiac end of the stomach, because of the possibility of rupturing the lower end of the esophagus.

We have found the Miller-Abbott tube of special value in the differential diagnosis of paralytic ileus and mechanical obstruction. I refer to those patients who four or five days after operation show distention, and more particularly to cases in which there is infection within the peritoneal cavity. Such cases often offer a problem as to whether one is dealing with a peritoneal exudate that has resulted in a kinking of the bowel, paralytic ileus or a combination of both. We have found that the tube decompresses the small bowel regardless of whether the condition is paralytic ileus or mechanical obstruction. When the bowel has been decompressed, we have passed 5 or 10 cc of a weak barium solution through the tube that projects beyond the balloon. This at once answers the question whether one is dealing with paralytic ileus or mechanical obstruction. In the former, the barium is found by x-ray to be in the large bowel. In the latter it will not have passed beyond the ileocecal valve.

THE PREVENTION OF DIABETES MELLITUS

A Clinical Lecture

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BOSTON

FOR several years, as an annual event in his course on preventive medicine at the Boston University School of Medicine, my friend Dr David L. Belding has asked me to give a lecture on the prevention of diabetes mellitus. This year I propose to thank Dr Belding for the compliment by retreating in print for in order to give the kind of lecture which he would like, vastly more knowledge is needed than is at present available and therefore I am asking my New England colleagues for assistance.

When all is said and done, peculiarly little is known of the cause of diabetes. Certainly to find an assured organic basis for the disorder is by no means easy, in spite of the excellent histological observations on the islands of Langerhans made by Opie¹ and by Weichselbaum and Staog² in 1900 and 1901, and in spite of the demonstration of the hydropic degeneration of the "beta" cells of these islands in experimental diabetes which Allen³ and Homans,⁴ working independently were able to accomplish a few years later.

Until recently, the physiological basis for believing that the pancreas has a good deal to do with diabetes seemed clearer, for in 1889, as everyone remembers, Minkowski,⁵ with the aid of von Mering, showed that ablation of the pancreas in animals induces a true diabetes mellitus, with glycosuria and hyperglycemia. This discovery, in fact eventually led Banting and Best⁶ to find insulin, an extract from the islet cells of the pancreas that has made of diabetes an easily treatable condition.

The work of recent investigators like Houssay⁷ and Young⁸ now throws a reasonable doubt on the belief that the pancreas primarily needs to be at fault in diabetes. Last winter at the Harvard Medical School, as many medical students recall, Dr Young showed slides from a diabetic animal which had developed a fatal diabetes although the pancreas had been left untouched. The disease was induced by injections of extract from the anterior lobe of the pituitary gland, and the resultant changes that took place in the pancreas secondary to such treatment were indeed remarkable.

Thus in diabetes we have a disease, with an

underlying cause still to be identified, that produces a clear-cut, unmistakable clinical picture. Diabetes clinically, however, is such a respectable, well studied affair that of course much is known of its natural life history, and hints have been given as to its preventability. In the sixth edition of Joslin's⁹ book on the treatment of diabetes mellitus, there is an interesting chapter dealing with this phase of the disease.

Joslin comes out flat footed; he says that heredity is the basis of diabetes. In the same volume White and Pincus elaborate on his views. They say that the evidence that the potentiality of developing diabetes is inherited rests primarily on four factors: the almost simultaneous occurrence of diabetes in both members of pairs of similar twins; its greater incidence in the blood relatives of diabetic patients than in those of a control population; the demonstration that Mendelian ratios of the recessive type are found in a large series of cases selected at random; and the demonstration of expected ratios of a diabetic tendency in presumably latent cases.

Their figures on twins are striking. In 19 pairs of dissimilar twins, one of whom became diabetic, the incidence of diabetes in both twins was 10 per cent. In 16 pairs of similar twins, one of whom became diabetic, it was 69 per cent. These figures are all the more remarkable because in the dissimilar twin group 10 per cent of the parents were diabetic, compared with only 6 per cent of the parents in the similar twin group.

The incidence of diabetes in the parents and siblings of diabetic patients differs significantly from that in the parents and siblings of non-diabetic subjects. White and Pincus found that among 434 parents and siblings of diabetic patients, 67 per cent were afflicted with the disease, whereas among 1219 parents and siblings of a group of patients without diabetes, only 1.2 per cent had it. These figures also seem convincing.

White and Pincus are as conservative as possible. They say that although the excess of diabetes in the blood relatives of diabetic patients suggests inheritance, it does not prove it, for to do so a pattern must be demonstrable. They have drawn some interesting speculation from Joslin's material, to the effect that diabetes does, in fact, follow a definite pattern of inheritance.

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and that this pattern, according to the Mendelian hypothesis, is one of simple recessiveness. On the other hand, Perkins¹⁰ regards the inherited tendency to develop diabetes as a dominant characteristic.

Admitting all this to be true,—that the cause of diabetes is uncertain, that heredity is the basis of it and that laws of heredity govern the transmission of the disease according to the Mendelian theory and follow the pattern of simple recessiveness or of dominance,—we are not much farther ahead when we begin to speak of prevention. For we do not know what determines the onset of diabetes.

Some secondary factor seems needed to activate the diabetic gene. White and Pincus chose the anterior pituitary lobe. They believe that something happens to this mysterious little gland which makes it hyperactive. Given an individual who inherits diabetic susceptibility and let his anterior pituitary lobe for some unknown reason become overactive, and he will develop what we clinicians call diabetes.

Joslin, on the other hand, blames obesity for being the flint that when properly struck makes the spark that fires the gene that causes diabetes. And he has a great deal with which to support this theory—statistics on the frequent association between diabetes and obesity, statistics from insurance records showing that the subsequent development among persons accepted for insurance after medical examination and known not to be diabetic is far more frequent among overweights than among persons of average weight or less, statistics regarding conjugal diabetes where, in his experience, both husband and wife have been fat, the implication being that they contracted the disease from exposure to good food rather than to one another, statistics regarding the occupational incidence of diabetes—"whenever and wherever conditions of life are easy, food abundant and relatively cheap over long periods, and when large numbers of individuals become accustomed to partake of food in excess of their requirements for the expenditure of energy, the frequent development of overweight and of diabetes is favored." In other words, those of sedentary occupation and large appetite are most likely to develop diabetes, those who labor the hardest and keep lean get it the least.

There are other influences than obesity that have to do with causing diabetes. Of these, racial peculiarities are the most outstanding. The high incidence of diabetes in Jewish people is proverbial. It has low incidence among the Chinese, Japanese and Negroes, and it appears to have rising incidence among the Irish. Factors like trauma, in-

fection, worry and arteriosclerosis do not appear important. This is about all that is known about diabetes and its etiology. The disease is a peculiar one, transmissible by inheritance, somewhat racial in character, afflicting fat people rather than thin, brought into being by an unknown factor, and perhaps more directly due to abnormal pituitary function than to abnormal pancreatic function, though pancreatic extract is the most useful therapeutic weapon at present available.

Can rational preventive measures be designed to operate against a disease about which, relatively speaking, so little is known? Joslin is optimistic. He is hopeful that the disease, to some extent at least, may be prevented by two barriers. If White and Pincus are right, a child cannot inherit a diabetic tendency from one diabetic parent alone but only from two diabetic parents, from one diabetic parent and a hereditary carrier, or from two hereditary carriers. The corollary is that to prevent diabetes, diabetic patients must not intermarry, or marry into families where diabetic carriers are known to exist, and they must remember that their children, too, must not marry diabetic persons or into diabetic families. As for obesity, Joslin says that it should be avoided generally, and particularly by the relatives of diabetic patients. Focus on the diabetic family, he says, for the prevention of the disease, remembering that all relatives, and especially the obese relatives, are the most susceptible. Hence, focus on the diabetic family to forestall intermarriage of diabetic carriers and to prevent obesity in all its members. Instruct each member not to marry into a diabetic family and never to allow his or her weight to go above the normal standard, in fact, after the middle of the fourth decade urge them to keep their weights 5 to 10 per cent below normal. If you can accomplish these things, you are doing all that can be done, in the light of present knowledge, to prevent diabetes.

I confess that I am a good deal less hopeful than is Joslin about the rationality of preventing diabetes. I present two cases to show why.

The first case is that of Mr. P. He is 56 years old, and a Yankee. He believes that his father died of "shock and diabetes," and he recalls having been told that a maternal uncle also had diabetes. Therefore, Mr. P. very obviously owns his diabetic genes by acquiring them in a most direct manner. To preclude his ever-developing diabetes, he should have been one of Peter Pan's "lost boys" and should never have been born, this would have been a hardship to him and his friends, for he has enjoyed life, been popular and accomplished much. Or possibly his parents should not have married each other, harboring as they did the power to transmit diabetes. The difficulty here is that Mr. P.'s father did not develop diabetes until he was an old man, nor did Mr. P.'s uncle. Mr. P.'s parents married when they were young, without estab-

lished diabetic family histories, knowing nothing of the disease and probably caring less and they lived happily together for a great many years. They brought contentment and sunshine into other people's lives for they were generous citizens. It would have been a loss to many people and even to all New England if in order to prevent a theoretically possible son from developing a theoretically possible diabetes, they had not married.

Mr P inherited another interesting tendency. Both Mr P's parents were stout people, and Mr P himself seemed doomed to a stout build. I have known him for nearly 50 years and can testify that during this last half century he grew from a stout little boy into a stout, thick-set, muscular young man, and has mellowed into a stout, thick-set older man. For the last 40 years he has been actively interested in all forms of physical exercise. He has played games regularly and violently. He has never been a gross eater, and has watched his weight with care. In fact, since 1908 he has kept a systematic record of his weight, not wishing to become too stout. During these 30 years his weight has fluctuated between a low point of 205 and a high point of 235. He has found that when he weighs too little he does not feel well and that to suit

been. The urine contained 1 per cent of sugar and the blood sugar concentration was 250 mg. per 100 cc. in other words Mr P had developed diabetes under my eyes.

Could the diabetes have been prevented? As has been said obviously not allowing Mr P to be born would have been one method, not altogether satisfactory for many reasons. Could his diabetes have been prevented by not allowing him to weigh so much? There is no way to answer this question with assurance. On the one hand are Joslin's statistics, which suggest that for Mr P to have avoided obesity would have been wise. On the other hand is Mr P's own experience, suggesting that had he kept his weight down he would have not felt well or have been so active as he proved to be, and thus would not have accomplished so much in life or have been so happy, and it is a dangerous doctor who is willing deliberately to gamble with the happiness and effectiveness of his patients' lives unless he knows exactly what he is doing.

Finally, there is evidence for thinking that one's type of body build is largely an inherited characteristic. Mr P with diabetic genes also inherited obesity genes. Thus, as he grew up had he kept his weight down by under-eating he still would have been a stout, thick-set individual, to be sure an artificially thin one, but nevertheless by constitution the same stout, thick-set individual he was designed to be and, so far as anyone knows, with the same inherited health liabilities. It seems to me that there is no certainty, with such inherited tendencies toward diabetes and toward body build that Mr P could have avoided the one by attempting to manipulate the other. In other words, I doubt whether his diabetes was preventable.

I cannot help raising one more question. Assuming that Mr P's diabetes could have been prevented, would to prevent it necessarily have been wise? He had fifty-five years of active, happy living as a prediabetic before the disease eventually became apparent. He took no particular care of his health during these years, kept largely out of medical hands and took life as it came. You will remember that a great many years ago Osler¹¹ wrote a most delightful paper, "On the Advantages of a Trace of Albumin and a Few Tube Casts in the Urine of Certain Men above Fifty Years of Age." I am sure that Joslin could write an equally appealing paper stressing the advantages to certain persons above that age line of a little glycosuria, for once patients of this age are conscious of the symptoms of diabetes, they seek medical advice and begin to take care of themselves. Mr P is a case in point. Very simple dietetic restriction after the diabetes made itself known, em



FIGURE 1 The Weight Curve of Mr P during the Period of Time He Was "Prediabetic"

his own particular sense of well-being, he can do most, with least fatigue, at a weight level of around 230 pounds. Between 1908 and 1936 he had scarcely a day's illness. Besides being active in athletics, he also has been in a position of considerable business responsibility and to all intents and purposes has been well.

Mr P consulted me professionally in June, 1936. At that time he did not have diabetes the urine was sugar free, and after an ordinary meal the blood sugar concentration was 100 mg. per 100 cc. He came to see me again on November 29, 1938. In the interval between the examinations he had gained 10 pounds in weight and had been feeling perfectly well leading his usually active life and having no physical complaints whatsoever. He told me that in August, 1938 he first became conscious of the fact that he was getting up two or three times at night to urinate. He denied any excessive thirst. He said that his appetite was as usual and no greater than it ever had

phasis on the importance of reasonable care and insistence on occasional check-ups have resulted in the disappearance of diabetic symptoms, slight loss in weight and an increased sense of well-being. The discovery of diabetes in Mr P's case will, I hope, prove to be a form of life insurance for him, as a result of which he will live longer and more happily than he could have done without it! You

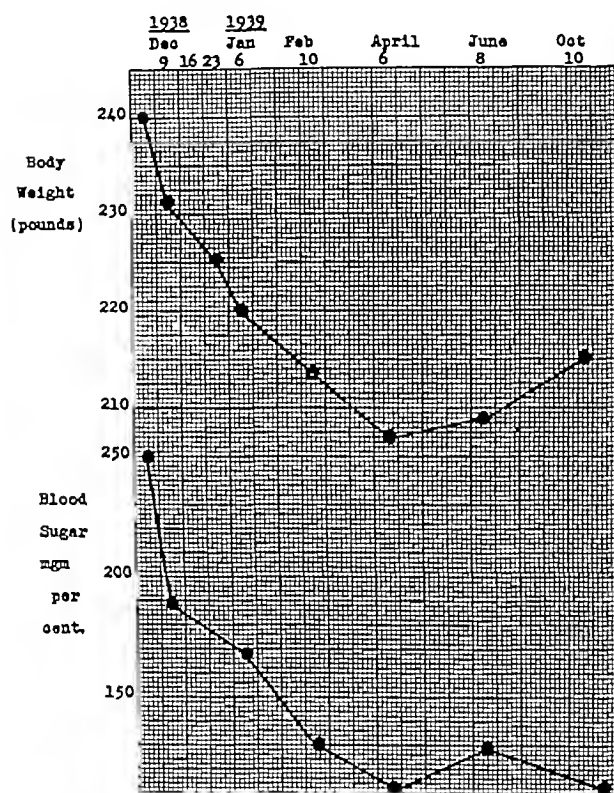


FIGURE 2 *The Advantage of a Little Sugar in the Urine of a Man above Fifty Years of Age*

Moderate diet restriction results in weight loss, an increased sense of well-being and a disappearance of hyperglycemia and glycosuria. Diabetes may be a good form of life insurance

can see that I am by no means convinced, even had it been possible, that to prevent diabetes here necessarily would have been judicious

The second case is rather different. Mrs. R. is a Jewish lady, 59 years old, whom I first saw 4 years ago. She consulted me for ill-defined aches and pains. A sister had died of diabetes, so that Mrs. R. presumably was to be regarded as a potential diabetic carrier. She was obese, too, for she weighed 162 pounds, which, for her height and age, made her nearly 30 pounds overweight.

The first specimen of urine which was examined contained 2.5 per cent of sugar. However, a fasting blood-sugar sample had a concentration of 140 mg per 100 cc., a fasting urine sample was sugar-free. I was uncertain whether she had diabetes, but on general principles advised her to follow a restricted carbohydrate diet. I saw her 5 months later, she had lost 7 pounds, and had a blood sugar concentration of 110 mg per 100 cc., and an entirely sugar-free urine.

I lost track of her for a year. Then, however, she returned with symptoms suggesting gallstones. She weighed 150 pounds and looked very well. Four samples of urine were examined, two were sugar-free, and two showed the faintest trace of sugar. Stupidly enough, my interest was so focused on the gall bladder, which proved to be normal, that I neglected to determine the blood sugar level.

A few days ago, more than 3 years after the last note, I again saw her. She weighed 154 pounds, thus revealing no great change in weight, she had no diabetic symptoms but called on me more for old times' sake than for any other reason. The urine had 5 per cent of sugar and the blood sugar concentration was 290 mg per 100 cc.

Could her diabetes have been prevented? At present we have the scantiest information regarding how the attack of what we recognize as diabetes commences. Both Mr P and Mrs R are interesting on this score. Mr P apparently developed clinical evidence of diabetes with relative acuteness, whereas Mrs R developed it so insidiously as to make it impossible to demarcate the nondiabetic part of her life from the diabetic.

I am in hopes that knowledge can be accumulated so that it may be possible to know more than is now known about the factors which make diabetes apparent. I am in hopes that more authenticated cases can be reported like the dramatic one of Wallach's,¹² which he described in 1866. There was a young chemist, it appears, who was in the habit of testing his own urine at least once a week, using it as a control against pathologic liquids whose sugar content was under analysis. His urine always was sugar-free. He had an attack of bronchitis, and as he was convalescing he began very suddenly to pass large quantities of urine, drink large quantities of water and lose weight. Wallach examined him and suspected diabetes, but, he wrote "Because the full significance of this illness was so well known to my patient, tact forbade me to test his urine immediately." A few days later the young chemist made his own diagnosis. Wallach goes on "I found my patient out of bed, sitting at his worktable, holding in his trembling hand a test tube with his own urine in it and with an ominous precipitate at its bottom." The poor chap died in coma within a few weeks of the first onset of symptoms. Here was a case beginning acutely. I, too, have seen a patient thought not to have diabetes when first she was studied who subsequently developed it with such apparent suddenness that she could remember almost the day and hour when symptoms began.

I believe that the question of preventing diabetes cannot be discussed any more logically or with any more conviction than I have discussed it here until more is known of the fundamental nature of the disease. It is to investigate this that I want help from my colleagues. Therefore,

I take this opportunity of begging them to send me case reports through which to study the possible factor or factors that induce the clinical manifestations of diabetes large numbers of case reports on patients well studied when they were nondiabetic, with accurate accounts of the manner in which diabetic symptoms seemed first to become apparent. A large group of cases analyzed from this approach not only might enable one to classify diabetes more accurately than can be done at present, but also might perhaps bring to light some common factor running through the group which would appear to define the agent that explodes the disease in the predisposed individual. Could the beginning of diabetes be recognized and the trigger that fires it be identified, better means for prevention might be developed than those advocated by Joslin. At present, in most cases, lack of knowledge makes the assured preventability of diabetes very elusive.

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ENGORGEMENT OF THE PULMONARY VEINS BY EXTENSION OF CARDIAC ENLARGEMENT POSTERIORLY*

Relation to Postural Dyspnea in Cardiac Patients

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ENGORGEMENT of the pulmonary vessels in cardiac patients is usually attributed to failure of the left ventricle. The latter causes an increase in pressure in the left auricle, and this pressure in turn is exerted backward on the pulmonary circulation. This theory of backward pressure, however, has not appeared to be fully satisfactory. Attention tends to be too exclusively centered on the heart, and adequate consideration has not been given to the mechanical relations of the heart to the structures behind it. It is the purpose of this article to present reasons in support of the conception that compression of the pulmonary veins and of the lungs by extension of cardiac enlargement posteriorly is a more valid explanation of engorgement of these vessels and of dyspnea of cardiac origin.

ENGORGEMENT OF THE PULMONARY VEINS

Overfilling of the pulmonary veins has become practically synonymous with failure of the left

ventricle, as may be documented by a citation from a recent book.¹ Thus

The clinical picture of isolated insufficiency of the left side of the heart is characterized by signs and symptoms resulting from engorgement of the pulmonary circuit in the absence of systemic venous engorgement and its consequence, such as edema and swelling of the liver.

The mechanism by which the engorgement of the pulmonary veins is produced is usually explained by what is known as the "back-pressure theory." Apparently this theory was developed approximately a century ago.

Corvisart,² one of Napoleon's physicians, in 1812 stated

It is possible that, in diseases of the heart, the difficulty of breathing proceeds entirely from the mechanical compression of the lungs, by the enlargement of the heart, or the evolution of an aneurysmal tumor; this is true in some cases, but in a greater number the difficulty of respiration appears to belong solely to the accumulation of the blood in the vascular system of the lungs, from the embarrassment which it suffers on returning into the cavities of the heart, deranged wholly or partly in their natural organization.

Hope,³ an English physician in his book published in 1842, further developed this conception, and to

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him is generally credited the origin of the back-pressure theory. He wrote

But when the distending pressure of the blood preponderates over the power of the ventricle, its contents, from not being duly expelled, constitute an obstacle to the transmission of the auricular blood. Hence the auricle becomes over-distended, and the obstruction may be propagated backward through the lungs to the right side of the heart, and there occasion the same series of phenomena

Harrison⁴ in his recent book supports the back-pressure theory

However, a considerable number of writers, among whom may be mentioned Mackenzie,⁵ Lewis,⁶ Starling⁷ and Wiggers,⁸ do not accept this explanation, save in cases of marked stenosis or insufficiency of the mitral valve. It should be noted that Hope's description contains the word "propagated", and a reasonable interpretation of this is that the pressure is transmitted backward through the blood in the pulmonary veins. Corvisart's words, as I understand them, are limited to emphasizing the importance of cardiac enlargement and engorgement of the vascular system of the lungs, "from the embarrassment which it suffers on returning into the cavities of the heart." The quotation does not elucidate the exact mechanism of the embarrassment.

I have found it difficult to be satisfied with the applicability of left ventricular failure to attacks of acute edema of the lungs experienced by patients with chronic arterial hypertension, when prior to the attack they have been in bed and asleep, whereas in the daytime they may have been ambulatory and relatively free of symptoms. Why do such left ventricles fail, even though they be abnormal, when the patient is in bed? Rest in bed is usually believed to be the best treatment for an individual with cardiac insufficiency. Since left ventricular failure is diagnosed in life by its effects, namely by engorgement of the pulmonary vessels, one tends to consider what there may be in the horizontal posture that might cause overfilling of the pulmonary vessels.

When the patient lies down, the lessening of the operation of the force of gravity causes a better return of the blood from the inferior vena cava to the right heart. This blood is promptly forwarded to the lungs by the contraction of the right ventricle, the Bainbridge reflex may be in operation in this situation. Thus, there is reason to believe that there is a generous inflow into the pulmonary vessels when the patient is in a horizontal position. Furthermore, when he lies down the heart naturally gravitates backward and rests more on the structures behind it (below it, in the horizontal position), if the heart be enlarged, it might conceivably exert a more than normal pres-

sure on its bed. It therefore becomes pertinent to consider the anatomic relations and physiology of the retrocardiac structures.

THE RETROCARDIAC SPACE

The retrocardiac space anatomically comprises part of the middle and posterior mediastinal spaces.

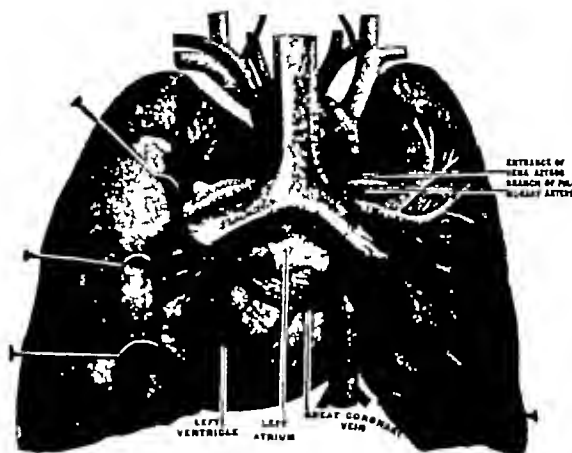


FIGURE 1 *Pulmonary Veins Seen in a Dorsal View of the Heart and Lungs*

The lungs have been pulled away from the median line, and a part of the right lung has been cut away to display the air ducts and blood vessels. (Reproduced from Anatomy Descriptive and applied Henry Gray From the new American edition [Philadelphia Lea and Febiger, 1913] By courtesy of the publishers.)

In brief, it is the area between the posterior surface of the heart and the front of the vertebral column.

The pulmonary veins pass through it, as they return the oxygenated blood from the lungs to the left auricle of the heart. Each venous trunk is formed by the union of the lesser radicles in the lungs and is about 1.5 cm. in length, both are approximately of the same caliber. The right pulmonary veins pass behind the right auricle and ascending aorta and superior vena cava, those on the left pass in front of the thoracic aorta. These veins are thin-walled, and contain no valves.

The inner or mediastinal surface of the lungs presents a deep cavity that accommodates the pericardial sac. Above and behind this concavity is a triangular depression termed the hilus, where the structures forming the root of the lung enter and leave it.

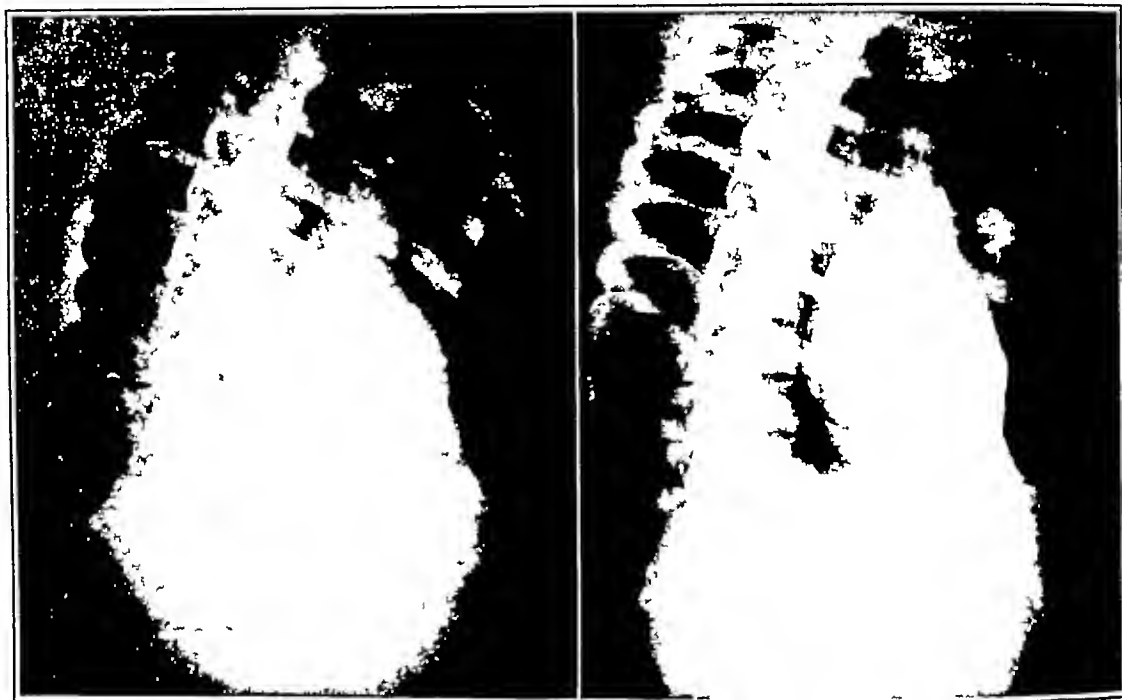
RESPIRATORY MOVEMENTS OF THE HEART AND LUNGS

Shipley⁹ states that the heart is attached to both lungs by means of the pulmonary artery and veins. It is also attached to the diaphragm at its central tendon by the pericardial covering of the inferior vena cava as it pierces the diaphragm. The heart is firmly fixed to the aorta, which is said to move

THE POSTMEDIASTINAL SYNDROME

There is a condition, sometimes termed the postmediastinal syndrome, in which dyspnea is an outstanding symptom. Tumors invading the posterior mediastinum are the usual finding at necropsy. Dyspnea of such causation is not infrequent in Hodgkin's disease. A recent article¹⁵ describes such a patient in whom dyspnea and

large pericardial effusion who automatically assume what is sometimes termed the "position of Allah," more accurately designated by the French as the *signe de la prière mahometane*. It is practically a knee-chest position. There are also those patients with huge hearts who cannot sleep save sitting in a chair, often leaning forward on the back of another chair or on another person in



A

B

FIGURE 4 Radiographs to Show Relation of Heart to Spine

A—at full expiration, B—at full inspiration The subject was a normal boy, aged sixteen years

severe asthmatic symptoms supervened when he lay on his left side. Relief was gained when he turned to the right side. A mass in the mediastinum was present.

French¹⁶ lists the causes of the postmediastinal syndrome as follows: aneurysm, a large heart, new growth, hydrothorax with marked displacement of the heart and enormous distention of the abdomen by ascites, tympanites and large tumors. He states that the chief reason why a very large heart or thoracic aneurysm may produce orthopnea, even when signs of cardiac insufficiency are absent, is that when the patient lies down there is less distance between the sternum and the vertebrae than when he sits up. The cause for the orthopnea is thus mechanical: there is more room to accommodate the abnormal mass when the patient sits up. In some cases he may be able to walk about without distress in the daytime, and yet be unable to lie down at night.

The foregoing reminds one of patients with a

front of them. May not both these conditions be due to the relief obtained by lessening the pressure on the structures back of the heart?

There are still other patients who experience severe dyspnea when they assume some particular position in bed. The condition has been long known and has been recently restudied.¹⁷ It is sometimes known as trepopnea. The particular position which causes severe dyspnea varies with different patients. If trepopnea be due to pressure of an enlarged heart on its bed, or on the structures behind the heart, it is reasonable to assume that the differences in the degree and type of cardiac enlargement might account for the variations in the posture that induces the dyspnea. Thus, the left auricle is enlarged in mitral lesions and the left ventricle in chronic arterial hypertension and lesions of the aortic orifice, sometimes enlargement involves the heart as a whole.

Patients with congestive failure often show engorgement of the pulmonary vessels when exam-

med radiographically. Following rest and digitalis the lung fields may clear and the patient improve. It is well known that a failing heart is prone to be dilated and that digitalis lessens the dilatation. In

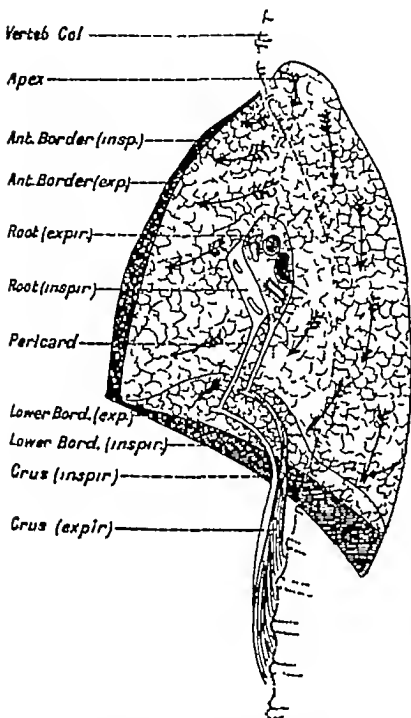


FIGURE 5 Mediastinal Aspect of the Right Lung to Show the Respiratory Movement of the Hilus

The crus of the diaphragm is also indicated and its attachment to the hilus of the lung through the pericardium. The arrows indicate the direction of the respiratory movement of the various parts of the lung (Reproduced from "The Mechanism of Respiration in Man" [Arthur Keith] in *Further Advances in Physiology* [New York: Longmans Green and Co. 1909]. By courtesy of the publishers.)

such a case the compression of the pulmonary vessels would be relieved, and with removal of the obstruction the pulmonary veins would be expected to cease being engorged.

POSTURAL DYSPNEA IN A SERIES OF PATIENTS

A series of cardiac patients have been closely questioned regarding the occurrence of dyspnea while they were in bed, their answers correlated with the fluoroscopic evidence of the backward

extension of their hearts. As controls there were selected other patients with proved disease of the heart and usually with some degree of cardiac insufficiency, but whose dyspnea was unrelated to posture.

There were 53 patients in all—17 with postural dyspnea and 36 without it. The former were all found to have marked extension of the heart backward into the retrocardiac space, whereas but 1 of the control cases had marked encroachment on the retrocardiac space. Some further details will be given, designating the two divisions as Groups 1 and 2.

Group 1 Fourteen patients had the predominant enlargement in the left ventricle, in 2 others it was mainly in the auricles, and in the remaining 1 the enlargement involved both cardiac chambers. Five patients reported that a particular position caused dyspnea more readily—4 the left lateral and 1 the right lateral position. Two of the 4 left lateral patients found the position impossible to maintain, they were definite examples of the trepopnea described above. Five other patients and 1 of those experiencing trepopnea were subject to paroxysmal attacks of dyspnea at night.

Group 2 All 36 controls had cardiac enlargement. In 17 cases the retrocardiac space was clear, in the remaining 19 the space was encroached on from slight to half its normal area, with 2 exceptions. In one of these the encroachment exceeded an estimated half of the retrocardiac space, in the other it was marked (this patient had a capacious and deep chest). As in Group 1 the encroachment was usually ventricular, the figures being left ventricle, 16 cases, left auricle, 2 cases, and pericardial effusion, 1 case. One of the group had had postural dyspnea three weeks previously, but it had disappeared at the time of the fluoroscopic examination. Two patients reported that if they lay on the left side they experienced symptoms other than dyspnea, in the first case it was anginal pain, in the second it was described as "grinding and palpitation." Still another patient found a particular position disturbing that is, anginal pain was prone to appear if he lay too flat.

Subject to the proviso that the number of patients examined for the purpose of correlating postural dyspnea with fluoroscopic evidence of backward extension of the heart was small, certain facts stand out. All patients with postural dyspnea were found to have marked encroachment on the retrocardiac space, usually by the left ventricle, whereas but 1 patient with a similar degree of encroachment failed to experience postural dyspnea. Encroachment on the retrocardiac space to a les-

ser degree — up to half its estimated* area — was common in cardiac patients not subject to postural dyspnea. The detection of 2 cases of definite trepopnea in so small a group was a surprise. Some evidence was also obtained regarding the relative frequency with which a particular posture is more disturbing to the patient. Certain data were not essential to the diagnosis of these cardiac patients and so did not appear in their clinical records, but were obtained when suitable questioning was employed.

DILATATION OF THE LEFT AURICLE

Some further information was also sought as to whether the back pressure was exerted from the cavity of the left auricle directly into the lumen of the pulmonary veins or by compression of these veins. When the heart is removed from the body at autopsy there are usually one or more sizable holes in the posterior wall of the left auricle. These are clearly an artefact. However, if the inside of this auricle be examined *in situ* it is found that the pulmonary veins are so arranged as to give some support for the conception that when the auricle is dilated a fold of its wall may close the orifice of the pulmonary veins. A situation may occur that is analogous to that of the urinary bladder, in which distention is said to cause a fold of mucous membrane to seal the urethral outlet and lead to further distention.

It is known that the left auricle is prone to distend, and it is difficult to conceive how this takes place unless the cardiac chamber be subjected to an internal distending pressure. It is likewise difficult to inflate a paper bag if there are holes in it. The capacity of the pulmonary venous system is so great that it is improbable that both the left auricle and the pulmonary veins are distended by blood driven backward, as when the mitral valve is incompetent.

COMMENT

It is appreciated that the back-pressure theory, based on left ventricular failure, has served to explain much that concerns the heart. The theory offered in this article differs less than one might think at first. The main point is that there is a hindrance to onflow by a mechanical compression of the pulmonary veins by cardiac enlargement. This conception appears more plausible in relation to postural dyspnea. When the patient lies down the structures that in the upright position are posterior to the heart become the bed for it, in other words, the enlarged heart lies on the pulmonary veins and their radicles.

*I am responsible for these estimates. I acknowledge the assistance of the roentgenologists of the hospital.

Dyspnea in cardiac patients is prone to be exertional or postural. Figures have been cited in order to emphasize the greatly increased volume of blood flow that takes place in response to exertion, and it is understandable that some obstruction to onflow, such as is present in mitral stenosis, for example, might then prove effective in damming back the flow through the pulmonary veins. An unfavorable posture, such as lying down, might likewise be effective in damming the flow, but might show more variance and develop more slowly depending on the type of cardiac enlargement, and where and to what degree it exerted pressure.

It was believed at first that encroachment on the retrocardiac space might give all the essential information regarding backward extension of the heart. However, it soon became apparent that examination of this space was merely a guide. There are probably other factors, such as posterior extension of the heart elsewhere than directly toward the spine, the position of the diaphragm (Fig 6), the amount of mobility in the thoracic wall and the size of the thorax as a whole. The reader is cautioned not to interpret the conception of pressure as being exerted solely on the pulmonary veins just before they reach the auricle, — they are stated to measure but 1.5 cm in length, — but to understand it as including their radicles, as they bring blood to the hili of the lungs.

Backward enlargement of the heart, particularly the left auricle, is credited with exerting pressure that causes such effects as aphonia, dysphagia and hydrothorax. Why may it not also so press on the pulmonary venous system as to cause engorgement of these veins? That the left auricle may compress even the superior vena cava appears from observations by Cossio and Berconsky¹⁸ made during the catheterization of the right auricle in man. Parenthetically, it may be pointed out that the distention of the cervical veins in their patients was not evidence of failure of the right ventricle and back pressure to the systemic veins, heart failure was absent in the cases studied.

Consideration of the findings in the series of patients studied for the possible correlation of encroachment of cardiac enlargement with the presence of postural dyspnea makes it evident that there is a considerable margin of safety, for more than half of the group not subject to postural dyspnea were found to have encroachment up to half the estimated area of the retrocardiac space, and in 2 cases the degree of encroachment was even greater.

There are undoubtedly factors inducing dyspnea other than engorgement of the pulmonary venous system, I refer to various reflexes of nervous origin.

and chemical changes operating on the respiratory center. These are adequately discussed in the textbooks of physiology. The purpose of the present article is to consider the significance of backward encroachment of an enlarged heart. En-

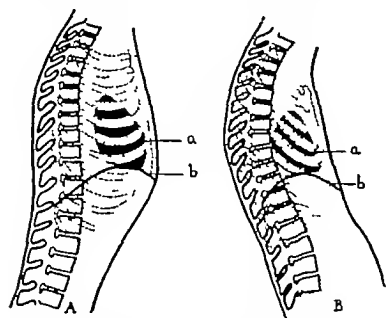


FIGURE 6. Diagrams Depicting the Effect of the Position of the Diaphragm and the Shape of the Thorax on the Relation of the Heart to the Vertebral Column. (Reproduced from *Body Mechanics in the Study and Treatment of Disease*. J. E. Goldthwait, L. T. Brown, L. T. Swann and J. G. Kuhns [Philadelphia] B. Lippincott Co. 1934.] By courtesy of the publisher.)

gorgement of the pulmonary veins, it is true, has been shown¹⁹ to induce dyspnea through a nerve reflex.

It is not asserted that the contents of this article have proved that engorgement of the pulmonary veins is caused by mechanical pressure exerted on their walls by backward extension of an enlarged heart, this is very difficult to prove. However it seems reasonable to suggest that physicians should not limit their thoughts to the heart in cardiac patients affected by dyspnea.

What can be done to improve the heart lung relation? For in a sense are we not all "heart lung preparations"? Some therapeutic possibilities come to mind. For example, should we not pay more attention to the posture of the patient? The use of a bed rest is a common procedure, but in patients who spontaneously assume the leaning forward posture should we not assist them, and make the position more satisfactory by the use of a pillow laid on a suitably placed table or chair? There are occasional patients in whom elevation on a bed rest gives but partial relief to dyspnea, but who will obtain greater ease if a leaning forward posture is prescribed. I have recently adjusted a hospital bed table in front of such patients and found that it lessened their dyspnea.

Crowding of the available space in the thorax by accumulations of fluid is an evident reason for

increased dyspnea. Removal of such effusions would seem to be indicated. An increased application of and a readiness to repeat thoracentesis have appeared to increase the comfort of our patients.

It seems reasonable to suggest the performance of the Brauer operation—the removal of the ribs over the precordia—in patients with marked enlargement of the heart and postural dyspnea, if the latter is unrelieved by medical therapy. The operation is believed²⁰ to be practically without danger, and can usually be performed under local anesthesia. It has been followed by great relief in 3 cases—1 reported by Morison²¹ in 1909 and 2 by Graham²² in 1929. Perhaps the significance of these operations has been lost sight of, since the Brauer operation was originally proposed for the relief of pericardial adhesions, although in these 3 cases it was performed for the purpose of decompressing an enlarged heart. I believe this operation to deserve further trial for the relief of the heart lung field.

SUMMARY

The conception is advanced that backward enlargement of the heart may cause mechanical compression of the pulmonary venous field and lead to engorgement of these vessels.

There are similarities to what is known as the posterior mediastinal syndrome.

Correlation of the fluoroscopic findings with the presence or absence of postural dyspnea resulted in considerable support for the above conception.

The production of engorgement of the pulmonary venous field by the compression caused by backward extension of an enlarged heart appears to explain postural dyspnea better than does the rather generally accepted theory of left ventricular failure.

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REPORT ON MEDICAL PROGRESS

GASTROENTEROLOGY

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THE literature for 1939 concerning the gastrointestinal tract is so voluminous that it is obvious that only a portion of it should be included in this review. For that reason, the present article will concern itself solely with reports of various diseases of the small intestine and of the colon. In certain instances comments and discussions of various articles involve a consideration of surgical procedures. Gastrointestinal disease, however, can rarely be classified as purely medical or surgical, and it is the intention of the reviewer to emphasize the diagnostic and broader therapeutic aspects of the subject matter to be surveyed, without any particular consideration of detailed technical procedures.

SMALL INTESTINE

Although no single pathologic condition involving the small bowel, with the exception of duodenal ulcer, is of great numerical importance, the aggregate of all conditions involving the duodenum, jejunum and ileum is of real clinical moment. With the advent of more precise methods of studying small-bowel physiology and improved x-ray technique, it is quite justifiable to comment on the various conditions involving this portion of the digestive tract. It is important to recognize that diagnosis of small-bowel disease primarily depends on the ability of the clinician to suspect its existence, inasmuch as routine roentgenography rarely demonstrates lesions of the jejunum or ileum. It should be stressed, therefore, that any history of abdominal distress or discomfort that tends to localize itself in the region of the umbilicus should raise the suspicion of disease of the small intestine, and should afford the basis for systematic x-ray stud-

ies of this region by repeated fluoroscopic and film examinations, made at hourly intervals.

Megaduodenum is a condition that should be diagnosed only after careful study and only with an exact knowledge of the typical x-ray findings. Sturtevant¹ describes in detail the x-ray criteria for such a diagnosis. Duodenal antiperistalsis, duodenal stasis, violent duodenal peristalsis and the "writhing duodenum" are the x-ray findings to be encountered in this condition, which, as a rule, is of little clinical significance. A discussion of the symptoms that sometimes occur can be found in an article by Weiss,² who considers the etiology of megaduodenum and reports 6 cases occurring in members of the same family during three generations. He correctly comments on the fact that the condition may be asymptomatic and quite rightly stresses the importance of very conservative therapeutic measures.

Duodenal diverticula are not uncommon and are almost always not the cause of symptoms. That they may occasionally cause symptoms suggestive of ulcer is indicated in the report by Boland,³ who describes a death due to an acute perforation of a duodenal diverticulum which occurred at the usual site, namely the second portion of the duodenum. Another report of somewhat similar nature is that by Schunk,⁴ who describes the traumatic rupture of a jejunal diverticulum. It should be stressed, however, that as a rule such diverticula cause no symptoms and do not warrant surgical treatment.

An unusual accident is that mentioned by Roach,⁵ who describes a fatal hematemesis due to a rupture of an abdominal aortic aneurysm into the third part of the duodenum. The history in this case was suggestive of an old duodenal ulcer, with symptoms extending over a period of ten years and even including one attack

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of bloody vomiting. The patient finally entered the hospital, and as on previous occasions, x ray films demonstrated a deformity in the region of the duodenal cap, apparently due to external pressure. A sudden fatal hemorrhage occurred, and autopsy revealed no duodenal ulcer but an erosion through the duodenum from a contiguous dissecting aneurysm of the abdominal aorta.

Disturbances of the jejunum and ileum are caused by a variety of diseases. A satisfactory and somewhat routine summary of these causes can be found in an article by Kiefer.⁶ Inasmuch as most of the symptoms of small-bowel disease are associated with the existence of partial obstruction, it is of importance to refer to articles dealing with various possible causes. One interesting cause is that reported by Havens,⁷ who discusses a case of intestinal obstruction caused by the use of colloidal aluminum hydroxide. This patient died of intestinal obstruction following a seven-day treatment of constant drip of this preparation. Such a serious outcome is rarely to be anticipated, but the frequent use of aluminum hydroxide gel as a treatment of ulcer warrants the suggestion that the preparation should be used with a good deal of care because of its tendency to provide the source for a nonabsorbable solid mass. Adamson and Hild⁸ also report a case of small bowel obstruction due to a mass, in this case occurring in an infant thirty six hours after birth the ileum being found to be packed with in spissated waxy meconium. Although the condition is rare, 22 cases have already been reported.

Intestinal obstruction due to intraluminal foreign bodies is really not uncommon, and the article by Storck, Rothschild and Ochsner⁹ is of value inasmuch as it reviews a total of 875 cases, exclusive of hernia, neoplasm and peritonitis. In this group, 51 cases were due to foreign bodies, of which the commonest were fecaliths and the next commonest, masses of intestinal parasites. The incidence of obstruction due to intestinal parasites naturally varies in different sections of the country, but the fact that they may cause intussusception, intestinal spasm and perforation of the bowel is worthy of emphasis. The article is complete and well worth careful reading.

Gallstones have long been known to be the source of intestinal obstruction, and the report of Wakefield, Vickers and Walters,¹⁰ although presenting no new material, is of interest in this connection. The authors point out that in every case the gallstones appear to have reached the intestinal tract via a cholecystoenteric fistula. The fistula may not remain patent after the passage of the gallstones. It is significant that some of

the patients described had recurring attacks of intestinal obstruction prior to the onset of complete ileus. McQueeney¹¹ records 2 rather unusual cases in which the patients survived gallstone obstruction of the bowel and lived with persistent intestinal biliary fistulas for fifteen and nineteen years respectively.

A rare benign cause of intestinal obstruction is that reported by Pachman,¹² who adds 3 cases to 33 others already reported in the literature as due to enterogenous intramural cysts. In his cases, the intestinal cysts were the cause of obstructive symptoms and occurred in children under one year of age. Shaw¹³ reports 5 cases of polyposis of the small intestine, a relatively rare clinical entity but important because of the tendency to malignant degeneration.

Lieber, Stewart and Lund¹⁴ reviewed the literature on carcinoma of the prepapillary portion of the duodenum in a study of 222 cases, including 17 of their own. This very dangerous condition is uncommon but it is necessary to point out that in most of the cases reported inadequate x ray studies had been performed with the result that only 17 per cent were correctly diagnosed prior to operation. The operative mortality in this condition is extremely high, with jaundice occurring in practically all cases, pain in about two thirds and fever in about one third. An excellent summary of the subject of tumors of the small intestine is that by Cohn, Landy and Richter.¹⁵ It contains an excellent bibliography, with a good review of the literature. The frequency of small bowel malignancy varies in different statistics, and the subject is also well covered by Medinger,¹⁶ who reviews the cases from the New England Deaconess and the Palmer Memorial hospitals. According to Medinger, malignant tumors of the duodenum and ileum appear to be slightly more frequent than those of the jejunum. Carcinoma occurs most frequently in the duodenum and jejunum and sarcoma in the ileum.

Leiomyosarcoma is extremely rare, only 6 cases being mentioned in the literature, 1 a recent case reported by Foshee and McBride.¹⁷ Another form of tumor that is uncommon but worthy of comment is the argentaffine tumor, which for the most part is found in the region of the appendix. Several individual cases are reported, but the series of 72 cases mentioned by Porter and Whelan¹⁸ is of particular interest. The incidence of the tumor can be readily seen in that only 72 cases were found in a total of 26,000 surgical specimens examined. In addition to these tumors in the appendix, 2 were found in the stomach, 1 in the gall bladder, 1 in the duodenum and 8 in the

small bowel. None of the appendiceal tumors were malignant, but of the 8 argentaffine tumors of the small intestine, 3 were malignant.

The importance of Meckel's diverticulum as a cause of intestinal obstruction is well known, as is the fact that not infrequently the diverticulum contains gastric mucous membrane. The case report by Martin¹⁹ describing an intussusception from such a diverticulum contains nothing new, but the accompanying résumé of the literature is presented in a well-organized fashion and is an unusually complete description of this form of small-bowel disease. The discussion includes a consideration of the condition, the acute and inflammatory process associated with Meckel's diverticulum, ulceration, perforation, hemorrhage and obstruction.

Hyperplastic tuberculosis of the small bowel is a recognized but rare cause of obstruction. Because of its infrequency, it is not generally recognized as a possible explanation for symptoms of intestinal obstruction, and for this reason the report by Caplan and Roantree²⁰ is worthy of consideration. Mesenteric adenopathy is well known to be a cause of symptoms simulating appendicitis or partial obstruction of the ileum, and may be a manifestation of tuberculous nodes or of some nonspecific inflammatory involvement. A complete description of the abdominal syndromes from adenopathies of the mesentery is presented by Parini,²¹ who discusses differential diagnosis and very properly concludes that surgical interference is usually indicated only in acute forms in the presence of intestinal obstruction due to acute supuration of the nodes. Too frequently, the demonstration of calcified lymph nodes throughout the mesentery is taken as an adequate reason for surgical intervention, although it not infrequently happens that symptoms are due to other causes or are unrelieved by surgical procedures.

An unusual form of intestinal obstruction is that reported by Orr,²² who records 2 cases associated with mechanical injury to the spine. The difficulties of diagnosis are obviously increased with a cast covering the entire abdomen, the pain being attributed in one of the cases to a broken back, and in the other to a paralytic ileus and pressure of the cast. In neither case was the diagnosis of intestinal obstruction adequately considered.

Intestinal intussusception in infants as a cause of small-bowel obstruction is well recognized. The report of Garcia²³ on 29 such cases is of interest, largely as a review of the physical findings and the technical surgical procedures necessary to treatment. Intussusception in adults is less common, however, and for this reason the short re-

port of Miller²⁴ is of interest as indicating that it may occur in the presence of benign tumors of the small bowel or in relation to Meckel's diverticulum. A somewhat similar report by Mendelson and Sherman²⁵ also emphasizes the various causes that may lead to intussusception of the small bowel or, for that matter, of the large bowel.

In discussing acute obstruction of the small bowel, Holt²⁶ emphasizes the obvious necessity of early diagnosis and treatment. Because of the appearance of the irreversible circulatory changes that take place, he makes out a good case for the therapeutic value of intestinal decompression and subcutaneous salt solution prior to actual surgery for the condition. A more valuable discussion is that of Gendel, Fine and Rosenfeld,²⁷ who record the results of experimental acute intestinal obstruction in dogs on blood plasma volumes. These authors stress the importance of the early progressive loss of blood plasma, which may reach a figure of 36 per cent within four to six hours, with a loss of plasma volume of as high as 55 per cent within twenty-four hours after the production of the obstruction. Such a loss of plasma, which is equivalent to around 3 per cent of the body weight, is more than sufficient in itself to cause death, and occurs particularly in those cases in which strangulation is added to obstruction. Blood-pressure readings apparently are not so accurate a guide to the patient's condition as are the hematocrit readings with their direct evidence of the loss of plasma volume. The administration of adequate quantities of plasma by the intravenous route is recommended by these authors, with sound reasons for advocating such a measure.

APPENDICITIS

That appendicitis still presents a challenge to the medical profession is obvious from the number of articles that have appeared during the past year on this subject. An increasing mortality from this condition emphasizes the necessity of educating the public against the continuous use of cathartics for abdominal pain and against delay in the diagnosis and treatment of acute abdominal pain, not only in the right side but also in the middle of the abdomen. This fact has been properly stressed by a rather forceful letter²⁸ in the *Journal of the American Medical Association*. The seriousness of the problem is apparent from the fact that approximately 16,000 deaths are reported in this country every year as due to acute appendiceal peritonitis. In Canada, appendicitis rates tenth as a cause of death.

The danger of delayed diagnosis is emphasized in an article by Kelly and Watkins,²⁹ who present

an interesting review of the results of 1000 consecutive cases of acute, simple and chronic appendicitis operated on within recent years, and contrast these with the results obtained in 1000 similar cases reported by them in 1931. The results in the latter series show no great variation from those previously reported, except for a sharp increase in the mortality rate noted in those classified as acute suppurative appendicitis. Under this classification there was a rise from a 9 per cent mortality in the first series to 23 per cent mortality in the second group. A similar increase in deaths from acute appendicitis was noted in an entirely analogous report by Quain and Waldschmidt^{30, 31} on two 1000-case studies reported in 1928 and 1934 respectively. They reported a mortality of 18.8 per cent during the depression years, as compared with a mortality of 10.0 per cent prior to that time. Kelly and Watkins believe that this rather alarming increase in mortality is due to a delay in operating because of economic reasons during the depression years and a tendency to use home remedies, including purgatives, before calling a physician. Meyer and his collaborators³² show about the same mortality rate at the Cook County Hospital in the years 1937 and 1938 as compared with the period from 1928 to 1932.

Numerous reports, such as those of Munroe,³³ Horsley,³⁴ Raffi³⁵ and Lundgren, Garside and Boice³⁶ seem to indicate that the mortality from certain groups of uncomplicated cases may be as low as 0.7 per cent. Perusal of these case reports however, suggests the possibility that these low mortality figures were encountered in the most favorable age groups, exclusive of children and older people, and quite probably in patients of the higher economic levels. Obviously, increased mortality rates are found in cases where delay has occurred and peritonitis is a complicating factor.

The treatment of over 100 consecutive appendicemias complicated by local or generalized peritonitis with non-drainage as recorded by Pickehl,³⁷ with a mortality of only 4 per cent, suggests that unusually great care was observed in the preparation and handling of individual patients. Some of the factors that may help lower the mortality are suggested by Wright, Aaron, Regan and Milch,³⁸ who report two small series of cases treated in 1935 and from 1935 to 1939, respectively. In all the cases there was diffuse peritonitis following perforation of the appendix. In the first group, the mortality was 45 per cent, in the second group, 12 per cent. In the first group the patients were operated on by six different surgeons, with no uniformity of treatment. In the second group three surgeons were responsible for the care

of the patients, and in their 60 cases it was concluded that the intelligent use of morphine, fluids, duodenal decompression and transfusions were of great effect in combating the hazard of peritonitis, with subsequent lowering of mortality.

The value of decompression by the Wangensteen technic is stressed by various authors, particularly where perforation has occurred. In children the need of immediate operation once the diagnosis has been established is stressed by numerous writers. In the uncomplicated cases, all the writers agree that the mortality is low. Thompson³⁹ discusses a group of 110 children with extra appendiceal extension, and expresses the belief that the chief factor in bringing about recovery is the nearly complete removal of fluid and gas from the distended paralytic or obstructed bowel loops. By careful attention to detailed preoperative measures, mortality was limited to 4.5 per cent in a group of 110 seriously ill children.

The importance of deferring operation in the presence of peritonitis due to ruptured appendix in children is discussed by Elman.⁴⁰ Decision to postpone operation, he thinks, depends not so much on the presence or absence or the degree of peritonitis as on the general condition of the patient. The amount of clinical toxicity obviously influences the mortality to a marked extent. In those patients with perforated appendices who were operated on at once, the mortality was extremely high, whereas in those operated on after careful treatment and a delay of from nine to twenty-four hours, the mortality was less than half as great. On the other hand, in the nontoxic group the condition was reversed, delay in operating apparently causing 15.0 per cent mortality as opposed to a mortality of only 3.5 per cent in those children operated on immediately. From these articles and from numerous others, it is obvious that most of the factors determining mortality are well known. Even in the most serious cases, however, sufficient delay with adequate preoperative treatment, including decompression of the distended small bowel and the proper use of fluids, tends to reduce deaths to a fairly reasonable figure. In passing it is of some interest to mention the case reported by Redon,⁴¹ if only to illustrate that at times appendicitis or acute intussusception may be completely reproduced by an allergic disturbance (Quincke's edema) with edema of the bowel. As a rule the diagnosis of appendicitis is simple, but such a diagnosis is not always warranted unless a fairly complete history has been obtained, which should include a few questions as to allergic disturbances.

The seriousness of "laxative induced peritonitis"

is brought out in an article by Bower, Burns and Mengle⁴² In this report the authors discuss the use of a concentrated *Clostridium welchii* antitoxin preoperatively or postoperatively as a means of localizing peritonitis Unfortunately no control figures are given, but the report is of theoretical and possibly of practical interest In this connection the paper by Bain and Feagles⁴³ is also of some interest These authors treated 100 cases of peritonitis from ruptured appendices and 15 other cases due to perforated viscera with intra-abdominal irrigations of peptone broth Apparently very favorable results were obtained, with a drop in temperature and pulse and a reduction in pus drainage The exact mechanism of such irrigations is discussed in terms of stimulation of the body-defense mechanism by foreign protein or stimulation of the formation of bacteriophage Such a maneuver is obviously in an experimental stage, but is of interest in relation to the work of Steinberg and others

Of further interest is the report by Carry, Brewer and Nicol,⁴⁴ who record the postoperative treatment of appendiceal peritonitis with sulfanilamide Twenty-six patients with general peritonitis and 15 cases of appendiceal abscess were treated postoperatively with sulfanilamide, with 3 deaths Of the patients who died, only 1 at necropsy still had general peritonitis of the lower abdomen Although the number of cases reported is too small to be statistically important, it will not be surprising if sulfanilamide or one of its derivatives proves of real worth in the management of these badly infected cases

An unusual complication of appendicitis is that reported by Parker⁴⁵ The patient was operated on for chronic appendicitis, and recovery was uneventful Three weeks after leaving the hospital the patient returned with a complaint of a rectal hemorrhage following a bowel movement Sigmoidoscopy was negative Two subsequent hemorrhages occurred, the last one of serious proportions Exploration revealed active inflammation of the cecum in the region of the stump of the appendix and a mass within the cecal wall, which on exploration was found to be an abscess cavity that had eroded into a large artery

ULCERATIVE COLITIS

Chronic idiopathic ulcerative colitis still remains an unsolved problem of great importance, and although studies as to its etiology are numerous, they are still unconvincing Two articles by Reed⁴⁶ present in summarized form the various views that have attracted attention as to the causation of this very grave condition Reed records the ob-

servations of Hurst, Thorlaxson, Felson and others on the relation between this condition and bacillary dysentery, and also considers the well-known studies of Paulson, Barger and Dack His own bacteriological studies are in accord with those of Paulson, who has concluded that as yet the disease has not been shown to be due to any demonstrable single infectious agent He stresses the need of considering bacillary dysentery, amebic dysentery and also other factors that are incident to the disease, such as psychogenic disturbances, deficiency states due to malabsorption and so forth He also points out the difficulty of accurate timing of surgical intervention, a fact that is well worth emphasizing The articles contain nothing new but are of some interest because the author reiterates most of the considerations that are generally accepted in relation to ulcerative colitis

One of the most significant contributions to an understanding of the subject is found in the brilliant observations of Lium⁴⁷ In experiments on dogs, by means of colonic implants he was able to demonstrate that mechanical stimulation, parasympatheticomimetic drugs or dysentery toxin causes spasm of the colonic musculature, with resulting damage to the underlying epithelial structure, hemorrhage and ulceration The mode of action of dysentery toxin in producing ulcerations of the mucosa is thus apparently due to the injurious effects of smooth-muscle spasm Hypersecretion of mucus was associated with increased muscular contractions at first, but later a thin watery secretion, inadequate for protective purposes, was observed, with resulting inadequate protection of the mucous membranes from trauma Lium discusses the possibility that ulcerative colitis may be conceived as a specific reaction to a number of influences that can initiate spasm of the colonic musculature These include possible hyperactivity of the parasympathetic nervous system, infections, such as bacillary dysentery, and vitamin deficiency Once the colon becomes spastic, it is potentially an organ that can produce damage to its own surface structures In analyzing the distribution of lesions observed in 6 fatal cases, Lium and Porter⁴⁸ conclude "It seems highly probable that ulcerative colitis is primarily a disease caused by intense muscular spasm and hypermotility and that, therefore, the distribution of the lesions follows a muscular pattern Whatever infectious element is present may well be due to secondary involvement of damaged areas caused by muscular overactivity" It is not difficult to draw an inference from a comparison between these striking observations of Lium and Porter and many of those cases of ulcerative colitis that appear to have their fundamental origin in an unstable and over-

stimulated autonomic nervous system. The changes visualized by Liem following the action of parasympathetic drugs are not dissimilar to those reported by White and Jones⁴⁹ and bear a direct relation to the clinical observations of Sullivan,⁴⁹ Murray⁵¹ and Alexander.⁵² on the importance of emotional factors in initiating this disease.

Clinical observations by Liem⁵³ on 8 normal individuals and 1 patient with ulcerative colitis are of interest in this connection. Measurements were made of contractility under measurable stimuli of the rectum, and the resulting rectometrograms indicated that the rectal contractions were much more powerful and prolonged in the presence of ulcerative colitis and were less amenable to relaxation by spinal anesthesia than in normal people. The importance of these continued contractions in the chronicity of ulcerative colitis is discussed. In this regard the studies of Barger and Jackman⁵⁴ are of interest therapeutically. They studied the influence of papaverine on the muscular tone of the intestinal tract. In their hands, papaverine, alone or combined with pantopon, has seemed to be of value in relieving abdominal cramps and frequent purulent bloody discharge in cases of colitis. The evidence obtained experimentally substantiates the antispasmodic effect of papaverine, and it appears to have certain advantages over pantopon in cases where it is desired to immobilize the intestine or put it to rest.

Specific measures for the medical treatment of this disease continue to accumulate. For the most part they have to do with local treatment of the bowel, treatment of various deficiency conditions resulting from the disease and chemotherapeutic measures directed toward more or less control of the factor of bacterial infestation. Gainsborough⁵⁵ treated a group of patients with cod-liver oil retention enemas, and while he frankly states that the method was certainly not a curative one, he believes that it was very efficacious in shortening the illness and reducing pain. He points out that these patients were more tolerant to cod liver oil enemas than to other local applications, a possible point of value in what is obviously merely palliative treatment.

Lerner and Rapaport⁵⁶ assert that vitamin A deficiency is one of the complications of ulcerative colitis, a statement which is not surprising in view of the probable interference of the disease with all fat soluble vitamins. Such a finding indicates, however, that deficiencies secondary to ulcerative colitis are numerous, and illustrates the complexity of the body changes incident to the disease. The suggestion of Cheney⁵⁷ that intensive liver therapy may modify the course of the disease is of some interest, but the evidence

that he presents is unconvincing. There is little doubt that satisfactory remissions accompanied the administration of liver extract, but one must remember that similar remissions occur spontaneously and frequently in this disease. It may well be that liver therapy does improve the patient's general condition to a high degree, but it is doubtful that anything further than this is accomplished.

Although no single chemotherapeutic measure has as yet been evolved that controls the relapses in this condition, sulfanilamide, Neoprontal and other drugs have been mentioned by various writers. One of the most recent reports is that of Hebb, Sullivan and Felton,⁵⁸ who discuss the results obtained in the treatment of 14 cases with rectal lesions of lymphopathia venereum and 4 cases of chronic ulcerative colitis with sodium sulfanilyl sulfanilate or with sodium sulfanilate. That the series is altogether too small to warrant definite conclusions is obvious and is admitted by the authors. The improvement observed in both groups, however is of interest, and in considering the patients with ulcerative colitis, one cannot help but hope that some such measure may control, at least to some degree, what obviously is frequently a bacterial infection of a badly damaged bowel. Any such help would be a welcome addition to our therapeutic measures in controlling the violent and dangerous exacerbations of the disease.

The surgery of the condition has been reviewed by various authors, and it is generally accepted that with the proper indications, an ileostomy, with or without a colectomy, is the best available method at present. The report by Cave,⁵⁹ while not presenting any new material, is of interest to this respect.

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTENATORUM AND POSTANTENATORUM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26151

PRESENTATION OF CASE

A thirty-eight year-old housewife was admitted to the hospital complaining of excruciating abdominal pain, with vomiting of five hours duration.

On retiring at midnight after a somewhat lively family birthday celebration the patient was aware of epigastric discomfort. Considering the party this was interpreted as the result of natural causes and she went to sleep. She awoke, however, about 3:30 a.m. with an intense upper abdominal pain, and began to vomit repeatedly. The pain was constant and unrelenting and felt like a "hot lead pipe the length of the abdomen." It radiated to the back and gradually extended downward. There were no cramps or periumbilical pains. The patient writhed and tossed in the bed and refused to call a physician, at 5:30 a.m. the husband finally called one. The doctor examined her thirty minutes later and found a "silent" abdomen which was somewhat rigid, especially in its upper portions, he also observed flecks of bright and changed blood in the vomitus. She was immediately referred to the hospital.

The patient had been married eighteen months but had not been pregnant. Six months before admission she was told that she had a "fibroid." Several years before entry she had had an appendectomy in an outside hospital.

Physical examination at 8:00 a.m., or about five hours after the onset of the acute pain, revealed a well-developed and well-nourished woman who did not appear very sick. Examination of the heart and lungs was negative. There was no audible peristalsis, and the abdomen was neither distended nor showed areas of definite tenderness. Both rectus muscles were held tight while the sides of the abdomen were soft. Pelvic examination revealed the presence of a tense, tender, cystic mass occupying and filling the posterior cul de sac; the patient identified this mass as the source of her pain. The remainder of the examination was negative.

The temperature was 98°F., the pulse 85, and the respirations 20.

Examination of the blood showed a white-cell count of 10,800, and that of the urine was negative.

Plain roentgen films of the abdomen taken in

the supine, upright and laterosupine positions showed no definitely abnormal loops of small bowel. In the upright position there was a fluid level to the right of the spine in the region of the gall bladder. Since the patient had had an enema before the film was taken, it was thought that this fluid level could have been in the colon instead of the small bowel. There was a small quantity of gas in a nondilated loop of small bowel at the level of the fourth lumbar vertebra. The soft tissues in the pelvis were dense, and there appeared to be a rounded smooth mass in the region of the uterus. There was no air under the diaphragm.

After catheterization the pelvic findings were unchanged. She was taken to the operating room, and an exploratory laparotomy was immediately performed.

DIFFERENTIAL DIAGNOSIS

DR. ARTHUR W. ALLEN: May we see the x-ray films?

DR. FELIX FLEISCHNER: The diaphragms are somewhat high, but there is no free gas below either leaf. I can see the fluid level mentioned. The amount of gas in the bowel appears to be about normal. However there is an area in the lower abdomen and pelvis which fails to show any gas-filled intestinal loop. This coincides with the soft tissue mass which was described. We can rule out perforation of a viscus.

DR. ALLEN: Would you say that the elevation of the diaphragm would give any information about the intra-abdominal pressure?

DR. FLEISCHNER: No. I cannot even state that the position of the diaphragm is unusually high.

DR. ALLEN: We have a young woman with a previously diagnosed pelvic mass, thought to be a fibroid with a sudden attack of abdominal pain. The pain was very excruciating, coming on suddenly and radiating to the back without any cramps and with a normal temperature and pulse and a slightly elevated white count five hours after onset. The x-ray films showed a soft tissue mass in the region of the pelvis. The pelvic examination before operation described a tender cystic mass in the pelvis. All these findings lead up to a perfectly classical textbook story of ovarian cyst with a twisted pedicle. Twists of the ovary and fallopian tube of pedunculated fibroids and so forth are apt to be sudden in onset and to come on while the patient is straining at stool. Such patients do not have any rise in temperature until gangrene develops in the obstructed organ and an elevated white-cell count is the first laboratory evidence that there is something serious about the matter. It is usually around 11,000 at the end of five hours, and it gradually rises.

There are certain factors about this case that

make me slightly suspicious that this obvious diagnosis is not correct. In the first place we are not sure what she means by "pain radiating to the back." If the patient had a penetrating ulcer of the posterior wall of the stomach or duodenum into the pancreas, the pain should radiate directly through the back at that level. If the diseased organ is the gall bladder and the pain radiates to the back the pain may be immediately behind the gall bladder but is more apt to be in the subscapular region. In a patient with small-bowel obstruction one of the chief complaints is backache that is usually in the lumbar region. If the patient has a pelvic disorder with backache, the pain is still lower,—down over the sacrum,—and that holds also for low large-bowel tumors, such as tumors of the sigmoid and rectum. We are only told that this pain radiated to the back.

One of the important observations is the fact that the vomitus was flecked with blood, but I think it probably has no significance because this patient obviously vomited very hard and the flecks of blood probably came from the engorged mucosa, either of the pharynx or esophagus. I believe that the physician who saw her first might have thought that the "silent," tense abdomen, the sudden onset of pain and the liquid indiscretions of the preceding evening might all have contributed to a perforated peptic ulcer. I think it is quite likely that was the provisional diagnosis when she came in here. The physical signs on admission seem to have ruled that out, and I believe the x-ray department believes that air will be found under the diaphragm in 80 to 90 per cent of cases with perforation of a hollow viscus, none was found here. The previous history of indigestion does not mean anything because a silent ulcer may perforate and bleed. I think we can rule out this possibility and that of any disease in the upper abdomen reasonably well.

There is one important part of the history that we must pay very strict attention to and not forget for a moment, that is, the fact that she had had an appendectomy a few years before. One of the common causes of subacute abdominal pain is intestinal obstruction on the basis of adhesions, it may or may not be preceded by a previous operation, but is more apt to come about if an operation has been performed.

Could this be a case of small-bowel obstruction? The onset of the pain was consistent with such a diagnosis, but I should expect the pain to have been described as crampy and not constant, and it states very definitely that there were no cramps or periumbilical pain. The fact that there was a cystic mass in the pelvis does not rule out intestinal obstruction, because we have frequently found during phases of ileus or obstruction a di-

lated loop of small intestine actually filling the pelvis and feeling like a cyst on pelvic examination. Frequently such obstructed loops of bowel have been mistaken for abscesses in the pelvis. The odds about trying to tie this up with small bowel obstruction are quite numerous. The character of the pain was wrong. We note the radiation of pain, but not to the right portion of the back. The fact that her abdomen was "silent" at the time the physician first listened to it before she had medication and again when she came in here is also against it. Also, I think it is unusual in intestinal obstruction not to have more evidence of dilated loops by x-ray even at the end of five hours, and I should not expect such a clear-cut round shadow as we have in this case.

I think one has to come down to an acute abdominal condition on the basis of a pelvic mass that has not gone far enough in its process to produce fever or much change in pulse or respiration, and only a slight elevation in white-cell count. I have to come back to my first impression, namely an ovarian cyst with a twisted pedicle.

DR WALTER BAUER Might it not have been an acute gastritis and an ovarian cyst which was not twisted?

DR ALLEN I think that is quite possible. I should hardly expect the pain to persist after she stopped vomiting and to be associated with this other mass which was felt by pelvic examination.

DR HORATIO ROGERS Dr Richardson saw this patient first, and I saw her when she came into the hospital. At first, as Dr Allen discussed it, I thought he must be familiar with the case because he followed exactly our line of reasoning. Dr Richardson at first thought it was probably an ulcer which had perforated into the lesser peritoneal cavity, and after we had the patient in the hospital and had more data my diagnosis was twisted ovarian cyst. It was on that diagnosis that I operated and found 50 cm of gangrenous small intestine in the pelvis, free bloody fluid and a tight band of omentum adherent to the site of the appendectomy under which the intestine had gone. It was quite easy to put my finger under this band, lift it up and cut it, whereupon the gangrenous intestine came up into the wound. We could then see the constrictions where the bowel and the mesentery had been dragged through under the band. We watched the intestine a reasonable length of time for the return of color, but as it stayed black it was resected. The patient made an uneventful recovery and went home on the sixteenth postoperative day.

DR TRACY B MALLORY Have you anything to add, Dr Richardson?

DR WYMAN RICHARDSON My diagnosis was

ruptured gastric ulcer. When I heard about the pelvic examination I said "I did not do it. Perhaps there was pus down there in the pelvis." The first striking thing about this patient was the subnormal temperature, furthermore, she seemed to be in good condition in spite of the most terrific pain. Another interesting feature was that the pain at six o'clock in the morning was high above the umbilicus in the epigastrium, radiating straight through to the back, it was very severe and non-cramplike. Later it began to radiate down in a vertical line, never radiating horizontally across the back. In retrospect I think probably the last is an important clinical finding to emphasize.

Dr. MALLORY: Did you find a fibroid?

Dr. ROGERS: Yes, there was an 8-cm fibroid which had nothing to do with the picture.

Dr. BAUER: Do you think that what you felt was the loop of small bowel?

Dr. ROGERS: I am certain of it. It was impressive how accurately the patient could tell when I touched it. It is of interest that when I reviewed the patient's history with her a few days later I still could not elicit a story that sounded at all like that of intestinal obstruction.

Dr. BAUER: If you were asked to feel a pelvis like this again, would you be able to say "This is small bowel and not a cyst?"

Dr. ROGERS: No, I think I should make the same mistake again.

Dr. GEORGE W. HOLMES: How long before the operation was the x-ray taken?

Dr. ROGERS: About five and a half hours.

Dr. HOLMES: The absence of dilated loops in the bowel is difficult to explain. Have you any explanation?

Dr. ROGERS: She apparently did not have time to develop gaseous distention. The loops of bowel in the pelvis were not distended with gas but with fluid.

CLINICAL DIAGNOSIS

Twisted ovarian cyst, with strangulation and gangrene.

Dr. ALLEN'S DIAGNOSIS

Twisted ovarian cyst

ANATOMICAL DIAGNOSIS

Gangrene of small bowel secondary to strangulation by adhesive band

PATHOLOGICAL DISCUSSION

Dr. MALLORY: The specimen we received showed gangrene of the bowel, but we were disturbed by the fact that there was no thrombosis either in the arteries or in the veins. Evidently the strangu-

lation by the adhesive band was so complete that the blood supply was totally cut off.

Dr. GRANTLEY W. TAYLOR: Have you any knowledge at what level of small intestine the obstruction occurred?

Dr. ROGERS: About 50 cm above the cecum.

CASE 26152

PRESENTATION OF CASE

An eleven-year-old American schoolboy entered the hospital with the complaint of jaundice of thirteen days' duration.

He had been perfectly well until thirteen days before entry when his schoolmates told him that his eyes were yellow. He had no complaints at that time except slight anorexia, although his urine was dark colored and his stools were somewhat paler than normal. He had no fever, vomiting, diarrhea or definite malaise, but occasionally did feel slightly nauseated. He stayed in bed for three days and at home for a total of a week. He returned to school for three days, after which his vacation began. His condition remained unchanged until two days before entry when it was noticed that his abdomen was enlarging. He began to complain that he had some abdominal pain when he bent over and that he felt somewhat listless. At no time had he had any fever, and the appearance of his jaundice was not preceded by any event which he could remember, such as the eating of a heavy meal. During the evening before entry he had severe pain in his rectum while moving his bowels. He had had no other symptoms.

The past history and family history were essentially negative. He had had measles, whooping cough, mumps and chicken pox. Before entering school his tonsils and adenoids had been removed because of occasional sore throats. He had had two or three colds a year but never any previous jaundice or prolonged periods of malaise. None of his schoolmates and no other members of his family were ever known to have had jaundice.

Physical examination revealed a well-developed and well-nourished boy in no apparent discomfort. The skin and sclerae were light yellow in color. The heart and lungs were negative. The blood pressure was 120 systolic, 80 diastolic. The abdomen was very protuberant, and the umbilicus bulged. The percussion note was tympanic in the midline and dull in the flanks. There was shifting dullness, but a definite fluid wave could not be made out. There was questionable tenderness, but no spasm. The liver could be palpated about 3 cm below the costal margin. Its edge was moderately firm, slightly tender, sharp and definitely

uneven The left lobe of the liver could not be palpated, but there was a mass in the left upper quadrant extending about 3 cm below the costal margin, which seemed to move on respiration. The extremities were negative.

The temperature was 99.5°F, the pulse 80, and the respirations 20.

The urine examination was negative. The blood showed a red-cell count of 3,400,000 with 70 per cent hemoglobin, and a white-cell count of 5600 with 62 per cent polymorphonuclears. The stools were brown in color and gave a ++ test for bile. The whole-blood nonprotein nitrogen was 28 mg per 100 cc, the serum protein 7 gm, with an albumin-globulin ratio of 1.0, the van den Bergh 134 mg biphasic, the phosphorus 2.90 mg, and the total cholesterol 135 mg. The chlorides were equivalent to 114 cc of N/10 sodium chloride. A sugar-tolerance test showed a fasting level of 54 mg per 100 cc, 109 mg at a half hour, 160 mg at one and a half hours, and 80 mg at three hours. The blood Hinton test was negative, as was a 1:1000 tuberculin test. An x-ray of the abdomen showed an enlarged liver and spleen. There were no unusual areas of calcification, and the kidneys were normal in size, shape and position. There was no evidence of disease in the bones of the arm or in those around the knee joints, and a skull plate was negative. An x-ray of the esophagus showed it to be slightly dilated. The rugae of the lower half were tortuous, definitely indicating the presence of varices.

For the first month in the hospital the temperature rose daily to 100°F, falling to normal during the night. Several urine examinations were normal, and the stools continued to contain bile. The red-cell count remained at a level of about 3,500,000, but he showed a persistent leukopenia, the white-cell count falling as low as 3250 with 65 per cent polymorphonuclears. During the first ten days the jaundice practically disappeared, but the ascites persisted. His condition otherwise remained unchanged.

An x-ray film of the chest taken at the end of the first month showed excellent excursion of the heart, with no calcification in the pericardium, no widening of the superior mediastinum and no evidence of adhesive pericarditis. On the thirty-seventh day an omentopexy was performed, following which he developed an acute otitis media which drained spontaneously. A culture of the pus yielded hemolytic streptococci. For seven days after the operation he had a septic temperature rising daily to 102°F., and he developed signs of consolidation in the chest. An x-ray film showed hazy dullness in the middle third of the right lung and at the left base. However, the otitis media and apparent pneumonia cleared up completely in a few days.

His course was uneventful for the next three weeks but at that time, nine weeks after entry, he began to have greater elevations of temperature, with a daily rise to 101 or 103°F. By that time the red-cell count had fallen to 2,800,000, with 56 per cent hemoglobin, and the white-cell count was 4600, with 38 per cent polymorphonuclears, 54 per cent lymphocytes and 8 per cent monocytes. A repeat x-ray plate of the esophagus showed varices more clearly visible and wider than at the first examination. A bromsulfalein test of liver function showed 40 per cent retention after five minutes, and 20 per cent after thirty minutes. The serum protein was 6.5 gm per 100 cc., the van den Bergh 341 mg, and the nonprotein nitrogen 23 mg. During the tenth week he again developed jaundice, which disappeared in the next ten days. The ascites increased in amount, and he had some diarrhea.

More careful inquiry into the patient's family history revealed syphilis in the mother and older sister. The mother had had positive serological tests one year before the patient's birth and had had three or four treatments at that time. On the basis of this, antisyphilitic therapy was begun, with potassium iodide and mercury by mouth. A lumbar puncture showed normal findings, with a negative Wassermann test on the spinal fluid. An abdominal paracentesis was done at the end of the twelfth week, and 4000 cc of clear straw-colored fluid was removed. A Wassermann test on the fluid was moderately positive. In the meantime the temperature fluctuation had become less marked, rising only to 100°F daily. Two cubic centimeters of Mercupurin intravenously produced 4500 cc of urine in the following twelve hours, two more abdominal paracenteses were done, yielding a total of 12,300 cc of straw-colored fluid. In the middle of the fourteenth week the urine for the first time showed a trace of albumin and contained occasional casts. Two subsequent specimens showed similar findings, and one contained 5 to 10 red cells per high-power field.

On the second day of the sixteenth week he suddenly vomited about 500 cc of coffee grounds material streaked with red blood. He became very restless and somewhat delirious and cried out as if in pain. There was a definite uremic odor to the breath. The nonprotein nitrogen of the blood serum was 55 mg per 100 cc., and the serum protein 5.5 gm. He was given 1/8 gr of morphine subcutaneously for the restlessness, and soon lapsed into coma with Cheyne-Stokes respirations. He remained in coma until his death, thirty-six hours later.

DIFFERENTIAL DIAGNOSIS

DR. JOHN H. TALBOTT The first diagnosis which

enters my mind when mention is made of an eleven year-old jaundiced schoolboy is catarrhal jaundice. As we read through the history, however, it is obvious that the diagnosis is not so easy as this. I should like to stress the point that he felt perfectly well until shortly before admission. The negative family history helps us to exclude certain familial maladies, such as hemolytic jaundice, Gaucher's disease and Cooley's anemia. On physical examination he was well developed and well nourished but had a prominent abdomen and a bulging umbilicus. Dullness in the flanks and the tympanic percussion note in the midline confirm the impression that there was an increased amount of abdominal fluid. It is possible for a huge spleen, such as may be found in myelogenous leukemia or Gaucher's disease, to simulate ascites, but any such degree of splenomegaly evidently was not present. The only mention that is made of a palpable spleen is the statement that a mass was felt in the left upper quadrant which descended on respiration. Until proved otherwise I shall consider this to be a spleen.

The enlargement of the liver, anemia and leukopenia are the first data which suggest that the malady from which this patient suffered was more chronic than the history admits. The anemia was associated with a color index that was slightly above normal, a fact which indicates that the former was not caused by chronic blood loss. The presence of bile in the urine together with a brown colored stool is in favor of intrahepatic rather than obstructive jaundice. The concentration of serum protein was normal, namely 7 gm per 100 cc. However, the albumin-globulin ratio was decreased, undoubtedly due to an increased concentration of serum globulin at the expense of serum albumin. The concentration of cholesterol was 135 mg per 100 cc. Similar low normal values may be found in patients with an acute hepatitis. The serum chlorides were considerably above normal. I recall one patient suffering from an idiopathic cirrhosis of the liver and bleeding esophageal varices who had a concentration of serum chlorides even greater than this. I do not know the significance of this association. The sugar tolerance curve is consistent with intrahepatic disease. The x-ray studies of the esophagus showed varices in the lower portion. The x-rays of the long bones and skull were taken presumably to help exclude xanthomatosis and Gaucher's disease. During his stay in the hospital further x-rays were taken to detect any calcification of the pericardium. From the data given in this abstract, I doubt very much whether I should have thought seriously of constrictive pericarditis to explain the whole picture.

An omentopexy was performed during the sixth hospital week. I should have been pleased to have a statement from the surgeon concerning the texture of the splenic and portal veins as well as that of the spleen. Following operation he contracted an acute otitis media and, later, patchy consolidation of the lungs, possibly a transient streptococcal pneumonia. Daily elevation of temperature suggests lymphoma or Hodgkin's disease, but there is little else to corroborate this impression. It is true that there was a relative increase in lymphocytes, but I should certainly not make a diagnosis of lymphoblastoma on this one report. The 20 per cent retention of bromsulfalein after thirty minutes is consistent with moderate impairment of liver function.

The family history of syphilis was discovered rather late in the disease to be of much help to the patient or to us in our differential diagnosis. On admission the blood Hinton reaction was negative, and the spinal-fluid Wassermann test subsequently negative. A moderately positive ascitic fluid Wassermann test only confuses me. If this patient were suffering from congenital syphilis of the liver and spleen, I should expect other stigmas and positive serum reactions.

Albumin and casts were noted in the urine shortly before death. These may be part of what is called the hepatorenal syndrome, about which, I confess, I have only a very hazy mental picture. The exitus was a rather precipitous one. The patient had a massive hemorrhage and vomited old and new blood. The restlessness following this hemorrhage or hemorrhages was treated with morphine. Apparently whoever ordered this drug failed to heed the advice of Dr. Mallory that morphine, even in small doses, is harmful to patients with cirrhosis of the liver. I should think that his death was incited by the hemorrhage and hastened by the morphine.

I believe that this boy was suffering from cirrhosis of the liver, splenomegaly, and thrombophlebitis of the splenic vein with esophageal varices. The cirrhosis may well have been idiopathic, but the whole picture fits the syndrome described by Banti. The occurrence of varices in syphilis of the liver is unusual. I should hesitate to call this congenital syphilis without additional evidence. It seems that the death might have been premature and that if he had survived the first hemorrhage he might have lived for several years.

DR. GEORGE W. HOLMES. The first film shows the characteristic picture of esophageal varices, namely the worm-like shadows of diminished density. In the second film the esophagus looks normal. That frequently happens in cases with

varices, and is a fairly good way to distinguish between deformity of the esophagus due to varices and that due to tumor. In the plain film taken of the abdomen, the edge of the liver is about 2.5 cm above the crest of the ilium, and there is a large area of increased density in the left upper quadrant, which might be a very much enlarged spleen. There is mottled dullness in the upper part of the right lung field, with similar shadows in the lower part. The bones of the skull, wrists and knees are negative.

A PHYSICIAN I should like to ask if morphine would be considered adequate cause of the terminal coma. At that age $\frac{1}{8}$ gr might be enough to cause it.

DR TRACY B MALLORY I have been impressed that following a single dose of morphine it is not uncommon for a patient with cirrhosis to develop coma and never come out of it. However, in view of the autopsy findings in this case it would be rash to conclude the morphine was solely responsible.

Dr Higgins, do you remember Dr Beth Vincent's findings at the time of operation?

DR HAROLD L HIGGINS The liver felt rough and was not nearly so large as had been thought on clinical examination. Because the patient had jaundice he thought preoperatively that the primary disease was in the liver and expected to find cirrhosis.

CLINICAL DIAGNOSIS

Cirrhosis of the liver ("toxic type" on biopsy)

DR. TALBOTT'S DIAGNOSES

Cirrhosis of the liver, splenomegaly, and thrombophlebitis of the splenic vein
Banti's syndrome?
Morphine intoxication

ANATOMICAL DIAGNOSES

Cirrhosis of liver, toxic
Septicemia, *Streptococcus haemolyticus*
Fibrosis of spleen
Otitis media, acute purulent
Ascites
Pleural effusion
Pulmonary congestion, slight
Acute glomerular nephritis, terminal
Operative wound omentopexy

PATHOLOGICAL DISCUSSION

DR MALLORY At the time of autopsy we found a slightly small liver, weighing 800 or 900 gm. It was very nodular and cirrhotic, and the nodules varied from a millimeter to a centimeter in size. On microscopic examination the liver architecture was totally destroyed. The liver cells were grouped

in clusters of varying size, without orientation about any central vein to differentiate lobular formation. Between the clusters of liver cells were bands of fibrous tissue containing innumerable bile ducts, which in some areas showed extensive branching, a picture which suggests that multiple contiguous liver lobules had been completely destroyed. In other words, the architecture was essentially that of a healed or nearly healed acute atrophy, with consequent early cirrhosis. There was still some progressive necrosis of the liver cells. The spleen was considerably enlarged, weighing 450 gm, and it showed very early fibrotic changes of the type one finds with any form of portal obstruction. There were no thrombi in the splenic or portal veins.

Microscopic examination provided one surprise. The kidneys showed a very early but definite glomerulonephritis, which I should tie up with a terminal streptococcal sepsis. The blood culture at the time of autopsy showed a beta hemolytic streptococcus.

I should not, personally, regard this case as an example of the currently much debated hepatorenal syndrome. In the few reliably reported necropsies dealing with this disease the lesion has been tubular rather than glomerular.

If I may step out of my role and discuss the differential diagnosis I am sorry that Dr Talbott did not consider the Banti's syndrome a little more fully. The hematemeses, the esophageal varices, the splenomegaly, the anemia and the persistent leukopenia clearly place this patient in that category, and experience tells us that such patients always have obstruction in the portal system or in the splenic veins. In adults the former is far commoner and is usually the result of cirrhosis of the liver. In children, however, portal and splenic vein thrombosis without cirrhosis occurs with significant frequency and must be given serious consideration. The presence of jaundice was, in this case, strong prima facie evidence in favor of cirrhosis. Had jaundice been lacking, the presence of ascites and the reversed albumin globulin ratio would have become important. Portal obstruction alone rarely produces ascites unless the serum albumin is lowered, and lowering of the serum albumin is strongly suggestive of hepatic insufficiency.

DR TALBOTT There was no evidence of syphilis?

DR MALLORY No.

A PHYSICIAN Have you any explanation for the intermittent character of the jaundice?

DR MALLORY No, but I am sure we have seen fluctuations in the level of hepatic incompetence in other cases of cirrhosis.

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ULTRA VIOLET CURTAINS

The Wellset¹ have conclusively proved that where an aqueous suspension of pathogenic bacteria is thrown into the air by an atomizer the water immediately evaporates and the micro-organisms remain suspended and animate in the air for hours and even days. On the basis of their observations they have advanced the ideas that contaminated air is responsible for the majority of nasopharyngeal infections and that the purification of air by means of ultra violet radiation is an important factor in the control of such diseases, particularly in hospitals, nurseries and the like. Furthermore, a speaker² at the last meeting of the American Public Health Association even expressed the belief that influenza and other respiratory diseases could be controlled by means of a curtain of ultra violet rays. Of these three

thoughts, the first appears to be obvious, the second, probable, and the third, fantastic.

Granting that such rays are effective bactericidal and viricidal agents and are excellent for the sterilization of contaminated inanimate objects, such as plates and tumblers, how can they be applied to the infected individual, be he carrier or patient? Again, acknowledging that the bacterium or virus cannot pass through an ultra violet curtain, how can such curtains be employed to protect a healthy populace? To consider an individual curtain drawn about each carrier or patient is an absurdity. A more pretentious one to protect a nursery full of children or a barrack of soldiers might work if one could be sure that those to be protected never left their haven and that no one from the outside ever entered both of which are obvious impossibilities. A wall of flame would seem to be just as practical and much more effective.

Attempts along similar lines to prevent sepsis following "clean" operations seem equally futile, for it is a well known fact that by far the majority of infections following this type of operation are due to micro-organisms from the mouth nose or throat of the operator or one of his assistants, rather than to those which are circulating in the air of the operating room. The operative field cannot be exposed to ultra violet rays, because tissue cells also succumb to such radiation. It is conceivable that a horizontal curtain of rays, just above the operating field, might have some effect, but many of the rays would be blocked by hands and instruments.

Until some agent is discovered which is more toxic for bacteria and viruses than it is for other living cells,—including those making up the human body,—epidemics due to diseases of the upper respiratory tract can be controlled only by the strict quarantine of patients, by the elimination of carriers and by measures to increase the specific or non specific resistance of the populace. Furthermore, it seems likely that unexplained post operative sepsis can best be prevented by the use of effective masks—if such there be—and by the elimination from the operating team of all those who harbor hemolytic streptococci in their mouths, noses or throats.

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AMERICAN SOCIAL HYGIENE ASSOCIATION

THE far-reaching program of the American Social Hygiene Association is not fully realized until one is confronted by the evidence of its activity. A recent pamphlet issued* by this association shows that taking the population as a whole one person in every twenty is infected with syphilis. This figure is not an exaggeration, and assumes even greater significance if one realizes that the incidence of syphilis is 50 per cent greater than that of tuberculosis, and that there are twenty-eight times as many individuals attacked by syphilis as by infantile paralysis.

The association has performed valiant service in furnishing information about syphilis and gonorrhea to the public. By exhibits, by lectures, by material furnished to newspapers and magazines, by radio, by mail and by moving picture films, wide publicity concerning these diseases has been given to millions of people. The staff members have traveled widely in order to increase contacts with clubs and societies and to set up local social-hygiene groups. The association has been influential in the establishment of premarital and prenatal examinations. Its legal staff has encouraged efficient administration of existing control laws, has made prostitution surveys in many cities and states and has studied medical quackery, particularly with regard to syphilis and gonorrhea, in forty-four cities in twenty-five states. It has furthermore made special studies of conditions near Army and Navy recruiting and training stations.

Its public-health and technical medical consultants have been continuously available to physicians and medical institutions. It has continued its program on sex education and has joined with the United States Public Health Service in the evaluation of health education in schools and colleges.

*How Social Hygiene Reached Out to Millions in 1939 New York American Social Hygiene Association 1940

While encouraged and endorsed by state and federal public-health agencies, all these activities have been supported and made possible by public subscription. Publication of facts and education are half the battle, and it is to be hoped that the funds will be forthcoming to continue this well-organized attack on the problem of genito-infectious diseases. Benefits are accruing, and will still further appear in the form of a decreased incidence of these diseases and fewer serious complications of such infections. This country is indeed fortunate in having an influential, vigorous association conducting such an aggressive campaign against these menaces to public health.

MEDICAL EPONYM

BORDET-GENGOU BACILLUS

The etiologic agent of whooping cough was described by Jules Bordet and Octave Gengou, of Brussels, in an article entitled "Le microbe de la coqueluche [The microbe of whooping cough]" in the *Annales de l'Institut Pasteur* (20 731-741, 1906). The translation of a portion of the article follows.

We have been able during the past year to isolate the specific microbe. The authenticity of this microbe as the causal agent of whooping cough depends, to be sure, in large part on the circumstances which existed when it was obtained, but the chief argument seemed to us to be furnished by the study of the specific properties of the serum. The serums of individuals who have not had whooping cough or who had it a considerable time previously, even in large amounts, do not agglutinate the microbe. The serums of children recently recovered from this illness possess an agglutinating power which is of moderate degree, but constant and definite.

R W B

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., Secretary
330 Dartmouth Street
Boston

SEPSIS FOLLOWING CESAREAN SECTION

Mrs. P, a thirty-one-year-old primipara at term, started in labor on March 30, 1927. Because of a high fetal head, she was seen in consultation

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

The family history was non-contributory. The past history included diphtheria at the age of three and mastoiditis at fourteen, for which no operation was performed. The tonsils had been removed. There was a history of "heart trouble" after an attack of influenza. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted four days without discomfort. The last period was June 16, 1926, making the expected date of confinement March 23.

The pregnancy had been complicated by Epstein's nephrosis. The urine had contained very large traces of albumin almost all the time, and the blood pressure had ranged from 118 to 130 systolic, 60 to 80 diastolic. She had a large amount of edema and gained 45 pounds in weight. The highest blood pressure recorded was 130 systolic, 60 diastolic, the day before delivery.

Cesarean section was advised. This was done under nitrous oxide, oxygen and ether anesthesia, and an 11 pound, 1 ounce, baby was delivered in good condition.

The day following operation, March 31, the temperature was 99.4°F, with a pulse of 92, and she complained of pain in the right shoulder blade. The temperature rose until it reached 105.6°F on April 2, with a pulse of 140 and respirations of 48. A medical consultation was held, and an x-ray showed pneumonia in both lungs. The temperature came down to normal on April 6, and vacillated between 98 and 99.6°F from then until April 15. On April 15 the temperature rose to 101.4°F, and the pulse to 120. At this time there was very definite tenderness throughout the lower abdomen. From April 16 to April 25 the temperature ranged from 99 to 101°F, but it came down to normal on April 25. From April 26 to May 21 the temperature ranged from 98 to 101°F, with a pulse of 90 to 110. During this period the tenderness in the lower abdomen subsided but a definite mass appeared in the epigastrium.

On June 7, because the temperature was still vacillating between 98 and 101°F and definite induration was felt below the umbilicus on the left, an exploratory laparotomy was undertaken. By this time the mass in the epigastrium had entirely disappeared, and exploration was carried out through an incision to the left of the midline about at the level of the anterior superior spine. No pus was obtained. From the time of operation until June 21 the temperature ranged from 100 to 102°F. From June 22 to June 30 it ranged from 98 to 99.2°F. There was one acute exacerbation on July 6 to 104°F, without anything being found on physical examination. From July 11 until discharge on July 22 the temperature re-

mained normal. During the period from April 15 until ten days before discharge there was a large amount of thin, foul discharge from the vagina, this definitely came from the uterus.

The white-cell counts during this period ranged from 15,000 to 20,000. The urine, save for a large amount of albumin, was always negative. No cultures were taken.

Comment. This case of sepsis following cesarean section began with double pneumonia, a very common complication of Epstein's nephrosis. Whether the infection in the uterus was a blood stream infection following the pneumonia is debatable. No uterine or blood cultures were taken. It is quite likely that at one time or another there was an abscess in the uterine wall which broke into the peritoneal cavity, was walled off and resulted in the definite mass that was felt in the epigastrium. Surgical interference had been considered off and on during convalescence, and was undertaken on June 7, with the idea of draining an abscess cavity and thus shortening the convalescence. This was not achieved. At no time was the uterus invaded.

When seen seven weeks after discharge, the patient's weight had increased from 102 to 123 pounds and she looked very well. The upper two thirds of the cesarean scar presented a hernia. Vaginal examination showed an indefinite fullness on the left, which it was believed would ultimately disappear.

This patient died of nephritis about three years later.

COMMITTEE ON INDUSTRIAL HEALTH

The Committee on Industrial Health has made two reports in which it has brought before the members of the Society what is considered as good practice in industrial medicine. These have been written to assist the general practitioner who is giving part of his time to industrial work.

The committee now proposes from time to time to give short reports of industrial cases. It is hoped that members of the Society will send to the committee similar reports for publication in the *Journal*.

The committee will be glad to answer, to the best of its ability, questions on industrial medicine sent to its secretary Dr. Louis R. Daniels, Hood Rubber Company, Watertown.

* * *

MODERATE PLUMBISM

F. F., aged 37 years and weight 183 pounds, a battery repairman for 1½ years, reported at the company dispensary on August 10, 1938, complaining of a severe pain in the hypogastric region. He gave a history of some

constipation, moderate loss of weight, weakness and anorexia. Abdominal examination was negative, the pulse and temperature were normal. The outstanding clinical feature was his extreme pallor. There was a suggestive lead line. A tentative diagnosis of plumbism was made. The following day a clinical laboratory reported as follows: "red cell count 4,500,000, hemoglobin, 80 per cent, smear shows an occasional stippled red cell, red cells are normal in size and shape."

The man was sent home with directions to obtain catharsis with salines, to drink a quart of milk daily and to take belladonna for cramps. In a week he reported that he felt well and that he had had no further abdominal distress. On reporting to work the following day, he was assigned to a job with no lead hazard.

Comment A case of moderate plumbism is described which occurred in a battery repairman of 1½ years' service, despite the fact that there had been no cases of plumbism for 50 years among the other men similarly employed. His pallor was all out of proportion to his anemia, it was apparent, and the stippled-cell count alone does not establish the diagnosis of plumbism.

For the past year and a half the score of battery repairmen have been examined each month. About 60 per cent of them showed from 2 to 20 stippled cells in 200 oil-immersion fields. None of them have shown any symptoms of plumbism during the period, except one man who showed a lead line daily during a 2-week period when his stippled-cell count jumped from 7 to 32. He was told to drink a quart of milk daily for a couple of weeks while he continued at his job. His stippled count then returned to the original normal level of 1 to 7. Improved housekeeping methods and forced ventilation during the "burning in" of battery plates should prevent further plumbism in the plant.

Conclusions There is a marked individual susceptibility to plumbism. Extreme pallor with only moderate anemia is indicative of the disease. The mere presence of stippled cells in the blood is not sufficient to make a diagnosis. Workmen exposed to lead who show symptoms of plumbism or a consistently rising stippled-cell curve should be placed where there is no lead hazard.

DERMATITIS VENENATA

On November 24, 1931, J. F. W., a lineman, reported to the company dispensary, exhibiting a skin rash of the hands which had every appearance of an early poison ivy dermatitis. He gave a history of picking up old guy wire in the brush along a roadside.

A dermatologist, employed by the insurance carrier, reported the rash to be industrial in origin and probably caused by lack of skin ventilation due to the constant wearing of gauntlet rubber gloves. He described it as follows: "On the backs of both hands and fingers and encircling the wrists is a dermatitis the lesions of which are red, slightly swollen and very itchy."

On February 1, 1932, a similar case appeared at the dispensary, and the same dermatologist noted that the rash appeared after the man had changed from one color of rubber glove to another. When the sixth similar case arrived on March 1, the man brought his gloves with him and the company physician patch-tested himself with a square of the glove, a markedly red, swollen and itching dermatitis developed under the square in about 16 hours. Patch tests done with other makes of gloves at the same time were negative. Therefore, the make of glove which gave the positive patch tests was eliminated, and no further dermatitis has developed.

Comment This dermatitis was definitely one due to an external irritant, but it took some time to incriminate the gloves, because the make of glove that had caused the dermatitis had been in use for years with no resulting dermatitis. Further investigation revealed that the glove manufacturer had used a new accelerator without previous determination of its irritant qualities. All men who wore the irritant gloves did not develop the rash, however; one man who wore the gloves for only 5 minutes developed a severe rash.

Conclusion There is a marked variance in individual susceptibility to external irritants which may cause a contact dermatitis.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions, given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau, have been arranged for the week beginning April 14.

BERKSHIRE

Thursday, April 18, at 4 30 p.m., at the Bishop House of Mercy Hospital, Pittsfield. Pediatric Institute. Discussion of hospital patients. Instructors: James M. Baty and Elmer W. Barron. Harry G. Mellen, *Chairman*.

BRISTOL SOUTH (Fall River Section)

Tuesday, April 16, at 4 30 p.m., at the Union Hospital, Fall River. Pediatric clinical cases. Instructors: Warren R. Sisson and Lewis W. Hill. Howard P. Sawyer, *Chairman*.

FRANKLIN

Thursday, April 18, at 8 15 p.m., at the Franklin County Hospital, Greenfield. Complications in Obstetrics. Illustrated by case histories. Instructor: Christopher J. Duncan. Halbert G. Stetson, *Chairman*.

HAMPDEN

Thursday, April 18, at 4 00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 15 p.m., in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Common Laboratory Procedures in Pediatrics and Their Interpretation. Instructor: LeRoy D. Fothergill. George L. Schadt, *Chairman*.

HAMPSHIRE

Thursday, April 18, at 4 15 p.m., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton. Pneumonia. Instructor: Earle M. Chapman. Warren P. Cordes, *Chairman*.

MIDDLESEX SOUTH

Tuesday, April 16, at 4 30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Head and Spine Injuries. Instructor: Walter R. Wegner. Dudley Merrill, *Chairman*.

NORFOLK

Thursday, April 18, at 8 30 p.m., at the Norwood Hospital, Norwood. Head and Spine Injuries. Instructor: Donald Munro. Hugo B. C. Riemer, *Chairman*.

NORFOLK SOUTH

Monday April 15, at 8 30 p.m., at the Quincy City Hospital Quincy Pneumonia. Instructor Don ald S. King. David L. Belding, *Chairman*

PLYMOUTH

Tuesday April 16 at 4-00 p.m., in the Nurses Home of the Brockton Hospital, Brockton. Common Problems of Neurology. Indications for lumbar puncture. Instructor T J C. von Storch. Walter H. Pulsifer, *Chairman*

SUFFOLK

Thursday April 18, at 4.30 p.m. in John Ware Hall Boston Medical Library 8 Fenway Boston Gonorrhea in the Female. Instructor Alonzo K. Paue. Reginald Fitz, *Chairman*

ANNUAL PRIZE FOR INTERNS

The attention of interns in Massachusetts hospitals is called to the fact that a prize of \$50.00 has been offered by the Massachusetts Medical Society for the best written and most comprehensive case report submitted by one of their number holding an internship in any Massachusetts hospital which is approved by the American Medical Association for intern training during 1938-1940.

This report is to be typewritten, and when completed is to be sealed, unsigned in a plain envelope, which in turn is to be placed together with a separate slip bearing the name and address of the contestant, in a larger envelope, and sent to Committee on Medical Education and Medical Diplomas, Massachusetts Medical Society 8 Fenway Boston.

The contest this year closes May 5 1940. Reports may be submitted at any time prior to that date.

DEATHS

DERVIN—LAWRENCE J. DERVIN, M.D. of Somerville, died March 30. He was in his sixty-fifth year.

Born in Clinton, he graduated from Fordham University and received his degree from Ludwig Maximilians-Universität Medizinische Fakultät in Munich, Germany. Dr. Dervin had practiced medicine in Somerville for thirty-five years. From 1926 to 1930 he was teaching assistant in pediatrics at Tufts College Medical School. Dr. Dervin was a member of the Massachusetts Medical Society, the American Medical Association and the New England Pediatric Society.

His widow two sons, two daughters and two sisters survive him.

FELCH—LEWIS P. FELCH, M.D., of Boston died April 2. He was in his sixty-ninth year.

Born in Nashua New Hampshire, he graduated from the Massachusetts College of Pharmacy and received his degree from Tufts College Medical School in 1906. He was appointed house officer at the Massachusetts General Hospital in 1909 and was appointed to the staff in 1912, resigning in 1922. He had been medical examiner for the industrial accident board for the past twenty-two years. Dr. Felch was a fellow of the Massachusetts Medical Society and the American Medical Association and held membership in the Boston Orthopedic Club.

His widow Dr. Carrie Innes Felch, who was in his class at Tufts, survives him.

HILTPOLD—WERNER HILTPOLD, M.D., of Easthampton, died April 5. He was in his fifty-second year.

Dr. Hiltbold received his degree in 1912 from the University of Vermont College of Medicine. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

MAINS—HERBERT L. MAINS, M.D., of Danvers, died April 7. He was in his sixty-fourth year.

Born in Salem New Hampshire, his family moved to Danvers where he attended school. He graduated from Dean Academy and received his degree from the University of Vermont College of Medicine in 1912. He served his internship at Western Hospital in Montreal Canada and entered private practice in Danvers. Later he became associated with the United States Veterans Bureau in Boston and then with various hospitals for tuberculosis and mental patients in New York. He returned to private practice in Danvers in 1936.

Dr. Mains was a member of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

MORSE—JOHN L. MORSE, M.D. of Newton, died April 3. He was in his seventy-sixth year.

Born in Taunton he attended Harvard University and received his degree from Harvard Medical School in 1891. He served his internship at the Boston City Hospital from 1890 to 1892. Later he served as an assistant in the Department for Diseases of the Nervous System at the Boston Dispensary and did orthopedic work at the Children's Hospital. He was also house physician at the Boston Lying in Hospital and was registrar of the Carney Hospital and district physician at the Boston Dispensary. For a number of years he served as chief of the medical staffs of the Children's and Infants' hospitals. At the time of his death he was consulting physician at the Children's Hospital, Infants' Hospital, Boston Floating Hospital, Beth Israel Hospital and the North Shore Babies Hospital.

In 1896 Dr. Morse joined the faculty of the Harvard Medical School as assistant in clinical medicine, and four years later became instructor in clinical medicine. In 1903 he was appointed instructor in pediatrics, in 1906 assistant professor of pediatrics and in 1911 associate professor of pediatrics. In 1915 he became professor and served until 1921 when he became professor emeritus.

Dr. Morse was a fellow of the Massachusetts Medical Society and the American Medical Association. He was twice president of the New England Pediatric Society and the American Pediatric Society and was a co-founder of the American Academy of Pediatrics.

His widow a son and three grandchildren survive him.

MISCELLANY

MEDICAL STORES BOUGHT BY RED CROSS FOR WAR RELIEF

Medicines hospital and surgical supplies loom large in American Red Cross war relief purchases, according to a recent tabulation of articles which that organization is furnishing its sister societies in war-affected countries to assist them in minimizing the sufferings consequent to hostilities.

Analysis of the tabulation dated April 1 reveals the following purchases: 500,000 tablets of sulfanilamide, 266,000 tablets of sulfapyridine, 100 tons of other assorted drugs, 23,000 surgical instruments, 38 x-ray units, 32 gen-

erating motors for x ray units, a 100-bed hospital unit, containing 700 items, 25 hospital tents each of 50-patient capacity, 11 motor ambulances, 1,500,000 yards of surgical gauze, 92,000 pounds of absorbent cotton for medical purposes, 276,000 yards of bed sheeting and large quantities of soap toothbrushes and other similar products

Purchases for relief also included 120,000 blankets, 105,000 suits of knitted underwear, 45,000 pairs of shoes and various other articles of clothing. In addition, women volunteers in Red Cross chapters all over the country have produced 344,000 garments and 500,000 surgical dressings. These are sent to the Red Cross warehouse in New York, where they are packed and shipped to the various Red Cross societies in the nine European countries currently receiving assistance. These are Finland, German-occupied Poland, France, England, Latvia, Lithuania, Rumania, Hungary and Yugoslavia. The latter five countries harbor some 122,000 Polish soldiers and civilians who sought refuge there last September.

American Red Cross relief operations in Europe are under the supervision of a commission of two men—James T. Nicholson, from the National Headquarters, Washington, District of Columbia, and Wayne Chatfield-Taylor, former assistant secretary of the treasury. With central offices at Geneva, they are in a position to visit the various relief fronts and personally supervise distribution of supplies and ascertain future needs.

NOTES

Dr. Elliott P. Joslin has recently accepted the honorary chairmanship at Yale University of the Division of Medicine and Public Health of the President's Committee on University Development, succeeding the late Dr. Harvey Cushing. The aim of the committee which Dr. Joslin heads is to secure additional endowment for the medical school so that its facilities may continue to expand, and along with them, its service to the community and the country. The committee also seeks to raise funds for a quadrangle to house medical students.

The appointment of Dr. Charles F. McKhann as professor of pediatrics at the University of Michigan Medical School has been recently announced. Dr. McKhann, who is associate professor of pediatrics at Harvard Medical School, will assume his new duties early this fall.

Dean Stanhope Bayne-Jones, of the Yale University School of Medicine, was elected president of the American Association of Pathologists and Bacteriologists at its recent annual meeting in Pittsburgh. Dr. Bayne-Jones, who succeeds Dr. Carl V. Weller of the University of Michigan, has been vice-president of the organization during the past year and a member of its council since 1937. A member of the executive council of the Association of American Medical Colleges, Dr. Bayne-Jones has been professor of bacteriology at Yale since 1932.

At the recent meeting in Cleveland of the American College of Physicians, Dr. Roger L. Lee, of Boston, was chosen as president-elect. He will assume office, following the expiration of the term of the present president, Dr. James D. Bruce, of Ann Arbor, Michigan, in the spring of 1941.

REPORT OF MEETING

HARVARD MEDICAL SOCIETY

There was a regular meeting of the Harvard Medical Society at the Peter Bent Brigham Hospital on January 9, with Dr. Elliott C. Cutler presiding.

There was one case presentation, by Dr. Harry B. Friedgood. A twenty-nine-year-old single Italian woman first entered the hospital in December, 1938, giving a history of increasing irregularities of menstrual periods since the menarche at the age of fourteen, with a marked change occurring at the age of nineteen. The patient was somewhat obese and hirsute with the onset of the catamenia, but there was a notable increase in both these characteristics ten years before entry. Physical examination on admission revealed a thickset, masculine woman with marked hirsutism of characteristic male distribution, an acneiform eruption of the face and back, and an enlarged clitoris. Blood pressure readings varied from 140 systolic, 90 diastolic to 160, 100. X-ray films showed no demonstrable pituitary, adrenal or thymic abnormality. Ten urinary specimens showed an average excretion of 37 mg. equiv. of androsterone in twenty-four hours, as compared with the normal value of 10 to 12 mg. equiv. In view of the finding of a right lower-quadrant mass considered to be an enlarged ovary and the absence of other localizing signs, a laparotomy was performed by Dr. Robert M. Zollinger. At that time there were found two enlarged ovaries, the right being five times normal size, both were enclosed in thick fibrous capsules. Since the organs were obviously nonfunctioning clinically, as well as useless by appearance, and since such ovaries are known to produce androgens, a bilateral oophorectomy was performed. Postoperatively the androgen level remained at 34 mg. equiv. and there were no other clinical evidences of improvement, with the possible exception of a slight decrease in blood pressure (130 systolic, 80 diastolic) and a questionable decrease in the growth of hair.

From April to October, 1939, no laboratory data were obtained and the patient's symptoms remained essentially unchanged. At the latter time, however, there was an acute attack of pain considered suggestive of either acute gall bladder disease or renal colic. The finding of an elevation of the urinary androgen level to over 50 mg. equiv. and the subsistence of symptoms led to further study, which revealed an androgen level persistently above 50 mg. equiv., supposedly in the range of cancerous lesions. Consequently an exploratory operation in the region of the left adrenal gland was performed by Dr. William C. Quinby in December, 1939, and a questionably abnormal organ removed, with the precarious condition of the patient precluding any further exploration. Tests on six specimens of urine since the operation have revealed an average androgen value of 27 mg. equiv., which is approximately half the preoperative level. This was taken as an indication that, at least in this patient, the urinary androgens originated in the adrenal glands and that no tumor was involved. For in the latter instance, the androsterone values would have either fallen promptly to normal in the case of a left-sided tumor or remained essentially unchanged in the event of a right-sided one.

In reply to Dr. Soma Weiss's question as to the validity of assuming that an elevation of the urinary androgen levels above 50 mg. equiv. indicates a malignant neoplasm, Dr. Friedgood stated that the chemical identity of the excreted androgens was probably a more significant finding. In cancer the percentage of dehydroisoandrosterone approaches 50 per cent of the total urinary androgen output, whereas the usual value is only 5 per cent.

The pathological department reported that the ovaries were very large, with dense fibrous-tissue capsules and no evidence of ovulation. The removed adrenal gland was within normal weight when due account was taken

of a large medullary hemorrhage. There was no evidence of neoplasia in any organ.

The speaker of the evening was Dr. H. Stanley Bennett, whose subject was "The Mechanism of Secretion in the Adrenal Gland." It was pointed out by way of introduction that the adrenal gland in mammals is really composed of two separate organs, each with its own secretion. Although the possibility of there being some chemical interrelation between these parts of the gland has been postulated, the presence of the cortical hormones from isolated nodules of cortex and the probable presence of adrenaline in the abdominal paraganglia obviate the necessity of any such hypothesis, and indeed make it untenable. Furthermore, fish, reptiles and amphibians have no such close spatial relation to these two organs.

Since it has been fairly conclusively demonstrated that the adrenocortical steroids are all derivatives of cholesterol and can maintain adrenalectomized animals and since it has been shown that the ketone fraction of the adrenal gland contains all this biologic activity, it was attempted to determine by color reactions the localization of the biologically active ketones in the adrenal cortex. In order to further clarify the mechanism of secretion, the blood vessel configuration in the gland was presented, for it was concluded that the hormone must exit via this channel since the lymphatics run only to the capsule. The audience was also reminded that the three zones of the adrenal cortex are in reality three phases of the life cycle of the cortical cells, which are formed in the subcapsular region and migrate inward to their senescence in the juxta-medullary portion of the gland.

By employing sudan III and osmic acid, Dr. Bennett was able to differentiate four rather than three zones in the adrenal cortex of the cat. The application of phenylhydrazine or ammoniacal silver solution to frozen sections showed that water-insoluble ketones were confined to the second of these four zones—the outer portion of the fasciculi—and that the biologically active steroids are hence localized in this area, which could be regarded as the secretory zone of the cortex. The specific ketone nature and the solubility properties of the compounds giving rise to the phenylhydrazine reaction were demonstrated by the prevention of the formation of the yellow color of the phenylhydrazones following previous acetone or alcohol extraction or by causing the sections to be immersed in a semicarbazide solution. Further observation of sections in which the cholesterol was precipitated by digitonin showed that the above-mentioned secretory zone is also richest in cholesterol and its esters. This is consistent with Fieser's assertion that cholesterol is a precursor of the steroid hormones. The four zones revealed in the cat's adrenal cortex by these methods were designated as presecretory, secretory, postsecretory and senescent, in accordance with the supposed functional state of the cells comprising the respective zones.

Dr. Bennett exhibited drawings demonstrating the cytology of the various zones, particularly the great increase in cell size and the number of secretory lipid droplets during the secretory phase. The findings were found consistently in all mammals when due consideration was made for slight quantitative variations of species.

A study of the blood supply revealed a rich radial plexiform arrangement of capillaries streaming from the capsule toward the medulla through the cortex.

Dr. Bennett inaugurated the discussion of the medulla by reminding his audience of the chromaffin reaction whereby a number of oxidizing agents will cause that part of the gland which contains adrenaline to be stained brown. This was considered to be due to the oxidation of the adrenaline to an insoluble brown substance and

the intensity of the brown reaction was thought to vary in proportion to the amount of adrenaline in the cells, thus accounting for the patchy character of the staining reaction. Ammoniacal silver solution was used to accentuate the varying color intensity and was of particular advantage in photographing sections of the gland.

A review of the medullary blood supply revealed that it arises from two sources: the cortical capillaries, which drain into an extensive branching venous tree in the medulla, and the direct radial medullary arteries, which pass from the capsule through the cortex to the medulla and break up into a fine capillary bed between the venous radicals in the medulla. A close analysis of the relation of the cells to the vascular system revealed the important fact that there was characteristically a true polarity of cells, with one end of the cell directed toward the arterially supplied capillaries and the other toward the veins. Properly prepared sections showed that the medullary cells were typically arranged as columnar epithelium along the veins, and that this arrangement gives rise to the appearance of the conventionally described cords and whorls in glands fixed by immersion. Further investigation disclosed that the nucleus was always nearer the capillary pole of the cell while the Golgi apparatus and secretion droplets occupied a position between the nucleus and the venous pole. It was concluded therefore, that the venous pole was predominantly secretory, whereas the opposite capillary pole was primarily nutritive. Cytological changes in the cells were correlated with different secretory phases of the cells, and the hypothesis was advanced that the medullary cells go through a series of cycles of secretion, in the course of which one can identify phases of storage of adrenaline, secretion, exhaustion and regeneration.

NOTICES

REMOVALS

ISRAEL KOPP, M.D., announces the removal of his office to 353 Commonwealth Avenue, Boston.

THEODORE J. C. VON STORCH, M.D., announces the removal of his office to the Robert Dawson Evans Memorial Department of Clinical Research and Preventive Medicine, of the Massachusetts Memorial Hospitals, 78 East Concord Street, Boston.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday April 23 in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance) at 8:15 p.m. Dr. Elliott C. Cutler will preside.

PROGRAM

Some Recent Advances in Our Knowledge of the Biliary Tract. Dr. I. S. Ravdin, of Philadelphia.

Medical students and physicians are cordially invited to attend.

BOSTON MEDICAL HISTORY CLUB

There will be a meeting of the Boston Medical History Club at the Boston Medical Library 8 Fenway Boston on Monday evening April 15 at 8:15. Dr. Robert B. Osgood will speak on "Menders of the Maimed."

All those interested in the subject are cordially invited to attend.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, April 17, from 2 to 4 p.m. Drs. Elliott C. Cutler and John Romano will speak on "Headache."

Physicians and students are cordially invited to attend

HARVARD MEDICAL SCHOOL LECTURE

The annual lecture on "The Care of the Patient" will be given by Dr. Charles R. Austrian, of Johns Hopkins University School of Medicine, at the Harvard Medical School, Amphitheater C, on Monday, April 15, at 5 p.m.

COMMUNITY NURSING COUNCIL OF BOSTON

The second annual meeting and luncheon of the Community Nursing Council of Boston will be held at the Young Women's Christian Association, 140 Clarendon Street, Boston, on Tuesday, April 23, at 12:30. Dr. Channing Frothingham will speak on "An Experiment in the Delivery of Medical Care."

The charge for luncheon will be 85 cents. Reservations, sent to the Community Nursing Council of Boston, 80 Federal Street, Boston, should be made by Saturday, April 20.

QUINCY CITY HOSPITAL

The fiftieth anniversary of the founding of the Quincy City Hospital will be celebrated on April 18 and 19. The program is as follows:

THURSDAY, APRIL 18

- 9:00-10:30 (Administration Building) Symposium on Fractures. Dr. A. W. Reggio and associates.
- 10:40-12:00 (Administration Building) Symposium on Obstetrics. Dr. F. L. Good and associates.
- 12:10-1:25 (Administration Building) Appendicitis Cases at the Quincy City Hospital. Dr. J. E. Knowlton.
- 1:30 (Nurses' Dining Room) Steak dinner for the members of the medical staff and of the Norfolk South District Medical Society.
- 4:00 (Administration Building) Blood Dyscrasias. Dr. W. P. Murphy.

FRIDAY, APRIL 19

- 9:00-10:30 (Conference Room, Administration Building) Panel Discussion: Modern surgery of the gall bladder. Conducted by Dr. W. R. Hurley.
- 12:15 (Neighborhood Club) Luncheon, to be followed by:
The Place of the Community Hospital in Any Public-Health Program. Dr. A. S. Pope.
History of Medicine. Tableaux presented by the graduates and students of the School of Nursing.
1940 Trends in Nursing. Elizabeth Sullivan, R.N.
- 7:00 (Neighborhood Club) Formal dinner. Dr. F. R. Burke, toastmaster, invocation by the Rt. Rev. Michael J. Owens, V.F. The scheduled speakers and their subjects are as follows:
History of the Hospital. Dr. C. J. Lynch.
Highlights in the Development of the Hospital. Drs. Burke, Reardon, McCausland, Hurley, Sargent, Adams and Lynch.
Present Day Resume of the Hospital. Mr. G. W. Hart, chairman of the Board of Managers.

The Role of Hospitals in the Progress of Surgery in the Last Half Century. Dr. E. C. Cutler.
Anticipated Future Developments. Dr. J. P. Leone.

NEW ENGLAND SOCIETY OF PSYCHIATRY

The annual meeting of the New England Society of Psychiatry will be held at Danvers State Hospital, Hathorne, Massachusetts, on Thursday, April 25.

PROGRAM

- 10:00 a.m.-1:00 p.m. Inspection of hospital.
- 1:00 p.m. Luncheon and business meeting. Dr. M. Ralph Kaufman will speak on "Factors in Psychotherapy: A psychoanalytic evaluation."

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

Because of the coming scientific session of the Academy of Physical Medicine at Richmond, Virginia, April 24 to 26, there will be no regular scientific program of the New England Society of Physical Medicine this month. Members will meet for a business session at the Hotel Kenmore on April 17.

NEW ENGLAND PATHOLOGICAL SOCIETY

The next meeting of the New England Pathological Society will be held at the Peter Bent Brigham Hospital on Thursday, April 18, at 8:00 p.m. Dr. Hamilton Montgomery, a member of the Section on Dermatology, Mayo Clinic, will speak on the subject "Pathologic Features of Some of the Non-Neoplastic Dermatoses."

Physicians and medical students are cordially invited.

AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS

The twenty-fifth annual meeting of the American Association of Industrial Physicians and Surgeons, together with the first annual meeting of the American Industrial Hygiene Association, will be held at Hotel Pennsylvania, New York City, June 4, 5, 6 and 7. This will be a four-day convention intensively devoted to the problems of industrial health in all their various medical, technical and hygienic phases, with particular stress on the prevention and control of occupational hazards. Important programs have been prepared, and technical and scientific exhibits will be a feature. The dinner on Thursday evening, June 6, will be the occasion of the presentation of the William S. Knudsen award for the year 1939-40. The medical profession is not only invited but urged to attend these gatherings as they will be of unusual interest and value to all practitioners interested in industrial injuries and illnesses.

ACADEMY OF PHYSICAL MEDICINE

The eighteenth annual meeting and scientific session of the Academy of Physical Medicine will be held at Richmond, Virginia, April 24, 25 and 26, under the presidency of Dr. Harold D. Corbuser, of Plainfield, New Jersey. The headquarters will be at the Hotel John Marshall, with demonstrations and clinics at the Academy of Medicine Building. Brigadier General Frank T. Hines, chief of the United States Veterans' Administration, will be the speaker at the annual banquet on the evening of April 25. Dr. J. Fulmer Bright, Mayor of Richmond, and other men of prominence will address the public meeting. There will be extensive exhibits. An attractive social program has

been planned for the ladies under the direction of Mrs. Thomas Wheelodon. The session occurs during Garden Week in Richmond.

The scientific program will be open to the medical profession without registration fee.

The program will be forwarded on request addressed to Herman A. Osgood, M.D., Secretary 144 Commonwealth Avenue, Boston.

AMERICAN PUBLIC HEALTH ASSOCIATION

The sixty-ninth annual meeting of the American Public Health Association will be held in Detroit, Michigan October 8-11 with the Book-Cadillac Hotel as headquarters. The Michigan Public Health Association, the American School Health Association, the International Society of Medical Health Officers, the Association of Women in Public Health and a number of other allied and related organizations will meet in conjunction with the association. The Michigan Committee on Arrangements is headed by Mr. Abner Larned, of Detroit. Dr. Henry P. Vaughan, health commissioner of Detroit, is executive secretary.

The annual meeting of the American Public Health Association is the largest and most important health convention held on this continent. It will bring 3500 health officials to Detroit for a series of scientific meetings covering all phases of health protection and promotion. A Health Exhibit will be held in connection with the meeting, and an Institute on Health Education is scheduled prior to the official opening.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY APRIL 14

MONDAY APRIL 15

5 p.m. The Care of the Patient. Dr. Charles R. Austrian. Harvard Medical School, Amphitheater C.

8:15 p.m. Members of the Malmed. Dr. Robert B. Osgood. Boston Medical History Club. Boston Medical Library & Fenway

TUESDAY APRIL 16

9-10 a.m. The Origin, Diagnosis and Treatment of Pityriasis. Dr. Oscar Hirsch. Joseph H. Pratt Diagnostic Hospital.

12 m. Surgery of the Lung. Dr. Edward D. Churchill. South End Medical Club. Headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston.

8:15 p.m. The Heredity of Mental and Nervous Disease and Eugenic Sterilization. Dr. Abraham Myerson. Boston Lying in Hospital, Journal Club meeting.

WEDNESDAY APRIL 17

9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

3-4 p.m. Headache. Drs. Elliott C. Cutler and John Romano. Peter Bent Brigham Hospital.

THURSDAY APRIL 18

9-10 a.m. Gastrointestinal Clinic. Drs. K. S. Andrews, H. H. Lerner and L. M. Aiken. Joseph H. Pratt Diagnostic Hospital.

8 p.m. Pathologic Features of Some of the Non-Neoplastic Dermatoses. Dr. Hamilton Montgomery. New England Pathological Society. Peter Bent Brigham Hospital.

FRIDAY APRIL 19

9-10 a.m. Hospital case presentation. Dr. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

April 15-17—American Association for the Study of Goltz. P. 203, issue of February 7.

April 15-19—New England Health Institute. Page 284 issue of February 15 and page 608, issue of April 4.

April 18 and 19—Quincy City Hospital. Page 634.

April 23—Harvard Medical Society. Page 633.

April 23—Community Nursing Council of Boston. P. 634.

April 4—Massachusetts Dental Society. Page 363 issue of February 29.

April 4-26—Scientific Session. Academy of Physical Medicine. P. 634.

April 25—New England Society of Psychiatry. Page 634.

Apr. 26—Sir William Osler Honorary Society of the Tufts College Medical School. P. 607 issue of April 4.

May 5—Boston Doctors' Symphony Orchestra concert. P. 607 issue of April 4.

May 9—Penmetzer Association of Physicians. 8.30 p.m., Hotel Bartlett, Haverhill.

May 10-18—American Scientific Congress. Page 1043 issue of December 28.

May 13—United States Pharmacopoeial Convention. Page 202, issue of February 7.

June 4-7—American Association of Industrial Physicians and Surgeons. Page 634.

June 7-8—American Heart Association. Page 469 issue of March 14.

June 7-10—American Board of Obstetrics and Gynecology. Page 608.

June 8 and 10—American Board of Ophthalmology. Page 719 issue of November 2.

June 10-14—American Physicians Art Association. Page 332, issue of February 22.

June 23-25—Maline Medical Association. Annual meeting. Rangleys Lakes.

October 8-11—American Public Health Association. Notice above.

October 21—American Board of Internal Medicine, Inc. Page 369 issue of February 29.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

May 8—Annual meeting. Salem Country Club, Peabody.

FRANKLIN

May 14—F. Jenkins County Hospital, Greenfield.

HAMPSHIRE

May 8, 11 & 13 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

May 15, 12.15 p.m. at the Unicorn Country Club, Stoughton.

MIDDLESEX NORTH

April 24.

June 31.

October 30.

NORFOLK SOUTH

May 2.

PLYMOUTH

April 18—State Farm.

May 16—Lakeville State Sanatorium, Middleboro.

SUFFOLK

April 24—Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

May 2—Censors meeting. Page 244 issue of February 8.

WORCESTER

May 8—Worcester Country Club. Dinner at 6.30 p.m. followed by business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

Fetal and Neonatal Death. Edith L. Potter and Fred L. Adair. 207 pp. Chicago University of Chicago Press, 1940. \$1.50.

The New International Clinics. Original contributions clinics and evaluated reviews of current advances in the medical arts. Edited by George M. Piersol. Vol. 1. N. S. 3. 319 pp. Philadelphia: Montreal and New York J. B. Lippincott Co., 1940. \$3.00.

The Newer Nutrition in Pediatric Practice. I. Newton Hugelmann. 1155 pp. Philadelphia: Montreal and London J. B. Lippincott Co., 1940. \$10.00.

Traité de l'immunité dans les maladies infectieuses. Jules Bordet. Second edition. 879 pp. Paris: Masson et Cie, 1939. \$3.50.

Elmer and Rose. Physical diagnosis. Revised by Harry Walker. Eighth edition. 792 pp. St. Louis: C. V. Mosby Co., 1940. \$8.75.

Obstetrics and Gynecology By the departmental staff of the University of Chicago and other contributors Edited by Fred L. Adair 2 vol 2031 pp Philadelphia Lea & Febiger, 1940 \$20.00

Transactions of the American Gynecological Society—1939 Vol. 64 Edited by Richard W. TeLinde 298 pp St. Louis C. V. Mosby Co., 1940

Clinical Roentgenology of the Alimentary Tract Jacob Buckstein 652 pp Philadelphia and London W. B. Saunders Co., 1940 \$10.00

Essentials of the Diagnostic Examination John B. Youmans 417 pp New York The Commonwealth Fund, 1940 \$3.00

Dermatologic Allergy An introduction in the form of a series of lectures Marion B. Sulzberger 540 pp Springfield, Illinois, and Baltimore Charles C. Thomas, 1940 \$8.50

The Pathology of Internal Diseases William Boyd Third edition 874 pp Philadelphia Lea & Febiger, 1940 \$10.00

BOOK REVIEWS

Injuries of the Nervous System Including poisonings Otto Marburg and Max Helfand. 213 pp New York Veritas Press, 1939 \$3.00

The senior author was for many years head of the Neurologisches Institut der Universität, in Vienna, and more recently has been connected with the Montefiore Hospital in New York. His work on the pathology of the nervous system is well known, and he has been one of the outstanding contributors to this subject in the last few decades. A book with such a distinguished man as one of the authors, therefore, needs careful perusal. The subject is carefully investigated with a reference list covering most of the literature published in recent years. One misses, however, one of the most important books on intracranial injuries issued in America in the last few years, namely that by Donald Munro.

The fields of symptomatology, pathology and treatment are considered both for cerebral injuries and for those of peripheral nerves. In addition, there are chapters on electric injuries, caisson disease, trauma as a cause of organic nervous diseases and poisonings. In a book of slightly over two hundred pages, the reviewer believes that the authors have tried to cover too much ground. Much of their material is presented in a sketchy manner, particularly that of the clinical manifestations of injuries and the sections on treatment. The part dealing with pathology is excellent, and there are a number of important illustrations. An interesting chapter deals with the relations between trauma and organic disease. As with most neurologists, the authors take the middle ground, pointing out that trauma may be a factor in almost any structural disease of the nervous system, although the incidence is small.

In general, the book reviews the subjects in a fairly adequate manner. Much of it is written, however, in the on-the-other-hand style, a definite stand is not taken, a position which would have been welcome in view of the well earned reputation of the senior author. The book is well printed, and the illustrations are adequate. There is a moderately extensive bibliography and index. It is a book which no neurologist should fail to read. It makes an interesting preparation for medicolegal testimony. It is not quite extensive enough, however, to be quoted and one hopes that the authors will write a book in the near future covering the subject in detail. There are a few

minor errors in spelling, such as, for instance, the name of Dr. Naffziger.

Diagnostic Signs, Reflexes and Syndromes W. Egbert Robertson and Harold F. Robertson. 309 pp Philadelphia F. A. Davis Co., 1939 \$3.50

This book is a valuable reference work. No one has heretofore undertaken to accumulate in a single volume the various signs, reflexes and syndromes, predominantly eponymic. In this volume they are arranged alphabetically and accompanied by a brief definition.

The appearance of this book is a significant event not because it is a definitive work but rather because it raises an issue which has been a source of controversy in the medical profession. The history of science is replete with manifestations of veneration for its pioneers. Nowhere is it carried to the degree found in the field of medicine. As is evidenced by this book we now find ourselves with a heritage of hundreds of non-descriptive eponyms impinging on the minds of the profession, obfuscating students and burdening medical literature. On the one hand is the sincere realization that the classical descriptions of the original observers warrant historical notation and recognition, on the other hand is the crying need for reorientation and simplification of medical terminology. The latter is illustrated in the following quotation from page 43 of the June, 1934, volume of *International Clinics* (Philadelphia, Montreal, London J. B. Lippincott Company):

Nonhemophilic, nonpurpuric, and nonthrombotic hereditary familial bleeding with or without (telangiectasia) hereditary familial angiomatosis (Rendu-Osler Weber's Disease or Goldstein's Disease), hemophilia, thrombasthenic and thrombopenic purpura, Frank's pseudohemophilia hepatica ("hypoleukia splenico-hepatica") and hemorrhagic capillary toxicosis, Von Willebrand's hepatogenic hemorrhagic diathesis, Jurgen and Von Willebrand's constitutional thrombopathy, David's hemorrhagic (dysendocrinism) disease in women, metropathia haemorrhagica, Glanzmann's familial thrombasthenic purpura, pseudohemophilia, and Biermer's hyperchromic macrocytic anemia, severe hypochromic microcytic anemia have, during recent years, received considerable attention.

Until some simplified form of medical terminology is adopted, it would be well to possess this volume, which is published in a handy size and is thumb indexed.

Civilization against Cancer Clarence C. Little. 150 pp. New York and Toronto Farrar & Rinehart, Inc., 1939 \$1.50

Any author will realize the obvious difficulties expected in writing a short book on cancer for the lay public. The inescapable limits to this subject, theoretical and practical, are so involved in details from all branches of modern science that it requires considerable skill to present the material in concise and understandable language. It must be admitted that the author has accomplished this singular feat, leaving out enough of the detail and selecting facts to support the educational program of cancer control. The book is interesting, contains a minimal amount of personal theories and reflects in a modest way the author's abilities in the field of organized cancer research. It is to be recommended to all and sundry and should prove of value in the dissemination of knowledge in this branch of medicine. The book when read will not frighten anyone, or subject him to any of the unusual fears of neoplastic disease.

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THE TREATMENT OF EPILEPSY AND OF MIGRAINE*

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BOSTON

THE treatment of epilepsy and of migraine is a large subject, both in extent and in difficulty. It concerns general practitioners as well as workers in laboratories.

In the United States, assuming there are 100,000 practicing physicians, the average physician should have the care of about five persons with epilepsy and fifty with migraine. The great majority of these persons are not patients, owing in part to the fact that physicians give little interest and less encouragement to would-be patients. A seizure of headache or of a convulsion is looked on as an act of God, against which the medical profession is helpless. This fatalistic attitude born of thousands of years of experience is no longer necessary. Cure is still a word to be used with caution, but some measure of relief is almost always possible.

First, let us examine the linkage of these two disorders, which at first thought are alike only because both occur in attacks, the person in the free intervals being essentially normal. In many respects the two conditions are opposites. Socially, migraine and epilepsy are far apart. Migraine appears oftener in the professional, brain using group and epilepsy in the laboring group. Migraine is respectable, even fashionable; epilepsy is an outcast in society, a Cinderella of medicine. Epilepsy is divided equally between the sexes; migraine is twice as common in women as in men. Epilepsy develops most frequently in infancy and adolescence, migraine in adolescence and beyond. Epilepsy often leads to mental deterioration, migraine does not. Emotional disturbances when present are usually the result of seizures in epilepsy and a cause of seizures in migraine. As a result, migraine patients are more elusive than epileptic patients, many victims of headache seeming to cling to their symptoms. Electroencephalo-

graphic records are grossly abnormal in epilepsy, and in pain free periods show doubtful abnormality in migraine. A treatment of dramatic benefit in one of these conditions fails to benefit the other. In epilepsy the essential lesion is a chemical disorder of neurones of the brain leading to a dysrhythmia of their electrical discharge, in migraine the etiology seems to be a dysfunction of the neuro-vegetative system, leading to abnormal relaxation of cranial arteries and undue stimulation of their sensory nerves. The attacks themselves differ widely in symptomatology—in migraine a gradual onset of hemispherical pain, with gastrointestinal and visual disturbances, in epilepsy a sudden loss of consciousness and involuntary muscular movements.

The principal reason for associating these widely differing phenomena is a generic one: they are inheritance linked. For many years we at the Neurological Unit have been gathering data from patients with epilepsy and with migraine, and also from samples of the population. I need not wade through a sea of statistics. A few statements will demonstrate the familial coincidence of the two conditions.

Among patients coming for treatment of migraine, the incidence of seizures was twelve times the incidence of seizures in the control group. Among patients coming for treatment of epilepsy the incidence of migraine was nearly twice the incidence of migraine in the control group.

As for the family histories of these patients, among the immediate relatives of migrainous patients epilepsy occurred three and six-tenths times oftener than among the relatives of the control group. Among the immediate relatives of epileptic patients, migraine occurred twice as often as among the relatives of the control group. If the patient had epilepsy, epilepsy was reported in 23 per cent of his near relatives. If the patient had migraine, epilepsy was reported in 1.8 per cent of his near relatives. (The incidence of epilepsy in

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the general population is approximately 0.5 per cent)

One further piece of evidence may be brought forward. If migraine bears a generic relation to epilepsy, the incidence of migraine among the relatives of patients should be greater in the so-called idiopathic epileptic than in the symptomatic epileptic group. To test this point the epileptic patients were divided into two groups, those without and those with evidence of brain injury antedating the onset of seizures. The incidence of migraine in members of the immediate family of the idiopathic group was 31 per cent, whereas in the symptomatic group it was only 1.9 per cent. The corresponding incidence of epilepsy among the relatives of the idiopathic group was 2.5 per cent, and of the symptomatic group 1.4 per cent.¹

This statistical evidence would seem to establish a definite relation between migraine and epilepsy. Obviously the two conditions are not twins, or perhaps even brothers. They are cousins, but not many times removed. Knowledge of one should throw light on the other. Any prohibition against marriage for the purpose of decreasing epilepsy should logically apply to migrainous as well as to epileptic patients.

TREATMENT BASED ON ETIOLOGY

Discussion of individual treatment cannot be concise and simple, because the causes of epileptic or migrainous seizures are complex and vary in different patients, and in the same patient at different times. I^{2,3} have likened migraine and epilepsy each to a reservoir which periodically fills and overflows its banks, the overflow representing the attack. Each reservoir is fed from underground streams representing both the fundamental and the contributing causes of the attacks.

As has been suggested by the statistics just quoted, the fundamental cause of both epilepsy and migraine is an inherited predisposition to the disorders. The logical prophylactic treatment is eugenic. Effective treatment from this direction has not heretofore been possible, since it is the predisposition and not the disorder itself that is inherited, and since there has been no means of detecting a predisposition to epilepsy or migraine in persons without these symptoms. Recently, however, the Gibbises and I⁴ found that 60 per cent of the near relatives of epileptic patients examined presented abnormalities in their cortical electrical records. Relatives with abnormal brain waves outnumbered those with a history of seizures about twenty to one. Therefore, for eugenics to be really effective the twenty per-

sons with cortical dysrhythmia, and not merely the one person with symptoms of epilepsy, should remain single. The same prohibition should apply also to the 10 per cent of the population who are not related to epileptic patients, and who yet have a dysrhythmia presumably indicating a predisposition to epilepsy, or to one of the other clinical disorders characterized by dysrhythmia.

As an offset to this gloomy subject, the important influence of a normal parent should be emphasized. Assuming that 10 per cent of the population have cortical dysrhythmia, by the law of chance only about 1 per cent of married couples would both have dysrhythmia. Yet 35 per cent of the pairs of parents of epileptic patients examined by us exhibited dysrhythmia of both parents. If an epileptic patient will choose a partner whose brain waves are normal, the chance of his having an abnormal descendant is much less than that accompanying the mating of two persons who are without symptoms but have abnormalities of their electroencephalographic records. Thus by use of a laboratory technic the medical profession can answer some of the perplexing questions of heredity. Hope of racial benefit from the application of this new knowledge is limited by the fact that social groups most in need of eugenics do not make use of it.

Even if a predisposition to epilepsy or migraine is present, the syndrome may not appear without the aid of precipitating influences. As has been stated, the character, number and relative importance of these factors vary in different patients. In epileptic patients injury of the brain is most important. Examinations must include procedures designed to disclose lesions of the brain, such as tumors, trauma, meningeal infections and congenital defects. In cases presenting jacksonian seizures (convulsions beginning locally without loss of consciousness), pneumoencephalograms should supplement the routine physical, neurological, spinal-fluid and roentgen-ray skull examinations. When intracranial lesions are demonstrable, the only treatment available is surgical, except that the insufflation of air required in making pneumoencephalograms is sometimes temporarily helpful.

Although the physician's main interest is centered in the brain, he cannot neglect the body, which houses the brain. Improvement in general physique is oftentimes associated with improvement of symptoms. Even less can the social and psychological factors be forgotten. Though the patient may not be rid of his fits, his life may be happy and useful if he is given the opportunity to preserve his self-respect and develop his abilities.

The sufferer from migraine has neither brain

injuries nor social stigmas with which to contend. In the majority of cases the galaxy of symptoms gravitates about the autonomic nervous system and those factors and occasions contributing to "nerve strain." In spite of a heredity that cannot be eradicated, many patients can be rendered symptom-free by removal of worries or fatigue, by lessening emotional stresses or by regulation of habits or improvement of physique. In women, because of the close correlation of headache attacks and menses, the freedom during pregnancy and the permanent relief with menopause, dramatic results might be expected to accrue from administration of hormones or the induction of artificial menopause. The latter expedient usually brings disappointment, but sometimes the administration of large amounts of Theelin seems beneficial.

TREATMENT BY GENERAL MEASURES OR DRUGS

The items of treatment mentioned are designed to remedy defects in the individual patient uncovered by the thorough study that he or she has supposedly received. Details of treatment for individuals would require more time than I have at my disposal. In addition to the correction of determined defects, there are certain measures that may be tried with all patients.

The study of patients with epilepsy has shown that certain alterations of physicochemical conditions in the body will decrease the liability to seizures. Apparently the changes are not specific, but act by decreasing nervous irritability and thus raising the seizure threshold. These measures are acidosis, dehydration, complete oxygenation and increased concentration of sugar, calcium and carbon dioxide in the blood and brain. Many of these have only laboratory application, but induction of acidosis in children by means of a ketogenic diet is of proved value. Some clinicians have faith also in dehydration, secured by drastic limitation of fluid intake.

Sodium Diphenyl Hydantoinate

Main reliance in the control of seizures has been the use of the sedative drugs, bromides and phenobarbital. Recently, however, Putnam and Merritt⁶ have demonstrated the value of sodium diphenyl hydantoinate, a drug which at present answers to the trade name of Dilantin Sodium. This has two points of advantage over bromides or luminal.

First, sodium diphenyl hydantoinate is not a sedative, and therefore its use in maximum doses is not accompanied by the dulling of mental faculties that is often a distressing feature of the drug therapy of epilepsy.

Second, for most patients with epilepsy, and during the two years in which it has been used, this

drug has proved more effective than others in the control of seizures. Merritt and Putnam⁶ have recorded 227 patients treated for more than two months. Because sodium diphenyl hydantoinate is not equally effective in all types of seizures, they have computed results for the three main types. In patients having psychic, grand mal and petit mal seizures the attacks were definitely decreased in 85, 74 and 59 per cent respectively. This improvement was over and above whatever benefit had been obtained by previous treatment—usually with phenobarbital. The favorable results were particularly notable in the case of psychic seizures, which are especially disquieting and may be made worse by heavy phenobarbital medication. On the other hand relatively few patients with petit mal were benefited, and some were actually made worse.

The administration of sodium diphenyl hydantoinate must be more carefully supervised than that of the sedative drugs. At the beginning one capsule containing 0.1 gm (1½ gr) is given three times a day after meals. The amount is slowly increased till the seizures are under control or

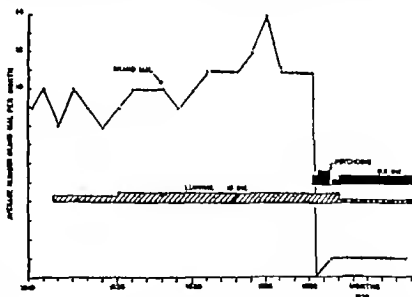


FIGURE 1 Record of Convulsions during Twenty Years in Patient C H

The abscissa represents time in years before January 1939 and in months thereafter. The ordinate represents the average number of grand-mal convulsions per month. Dosage of phenobarbital (luminal) and of sodium diphenyl hydantoinate (Dilantin) is indicated on the chart.

toxic symptoms appear. Six capsules a day seems to be the limit of tolerance. The commonest toxic symptoms are ataxia or tremors, gastric pain or distress, skin rashes, hypertrophy of the gums and psychic upsets. To overcome these untoward symptoms the amount of medicine may need to be temporarily reduced. Persistence will oftentimes carry the patient through temporarily distressing symptoms. Although sodium diphenyl hydantoinate often proves of no benefit, improvement when it does occur may seem miraculous.

A young woman's parents have recorded twenty-two hundred severe convulsions in the course of the last twenty years. As may be seen in the accompanying chart, the number of seizures per year remained remarkably constant and was not influenced by any of the treatments which other physicians and I at various times tried. Phenobarbital was of some benefit and from 1½ to 3 gr was taken daily throughout the period. In January, 1939, the patient was given 0.3 gm of sodium diphenyl hydantoinate. Very soon she went into a psychotic state, which persisted for twelve days. Medication was stopped, but was resumed at the rate of 0.2 gm daily as soon as the psychosis cleared. In the subsequent seven months the patient had only seven convulsions, and her depressed mental state, which I had considered permanent, perceptibly cleared.

Ergotamine Tartrate

In the case of migraine, a drug has in recent years come into use that is equally dramatic in its action.^{7, 8} This is ergotamine tartrate, sold under the trade name of Gynergen. In approximately 90 per cent of patients who are having an attack of migraine and who are given a parenteral injection of the drug, the headache and other symptoms disappear as by magic. That the action of the drug is specific, and not merely that of a pain sedative, is proved by the fact that nonmigrainous headaches are not ordinarily benefited by ergotamine.⁹ The dose is 0.5 mg, —the contents of an ampule, —injected into a vein, muscle or the subcutaneous tissue at the onset of the symptoms. In 45 per cent of the cases there is associated nausea and vomiting. The occasional patient complains of extreme lassitude or of muscle soreness, or rarely of precordial pain. Ergotamine tartrate comes also in 1-mg tablets. Five to ten milligrams may be taken in the course of several hours for a headache attack. In addition to the probability of its being vomited, the drug is poorly absorbed from the intestinal tract, and unless the headache is a mild one its termination is not to be expected from oral administration.

During the last three years we have also used a newly isolated alkaloid of ergot called ergonovine. This fraction of ergot is more prompt and potent than ergotamine tartrate in promoting uterine contractions. For migraine, however, the drug is much less dramatic in its therapeutic effect. Of 54 patients given ergonovine by injection, only 39 per cent were completely relieved.³ However, those patients whose headaches are less stubborn and who have relief from ergonovine prefer it to ergotamine, for the nausea and vomiting are less

pronounced. Also, ergonovine is apparently readily absorbed from the gastrointestinal tract, and the minority of patients who are helped by the drug may obtain relief from its oral use. In my series, 21 per cent obtained no relief when ergonovine was injected, and 33 per cent no relief when it was taken by mouth. The proprietary names of ergonovine are various: Ergometrine, Ergobasine Tartrate, Ergotrate, Ergoklonin. Doses are approximately the same as that for ergotamine tartrate. In the majority of cases, continued use of ergot does not make subsequent headache less severe or less frequent.

Presumably the mechanism of pain production is the same in all patients. The work of Graham and Wolff¹⁰ indicates that relief of migraine headache by ergotamine is attended by coincident decrease in the pulsation of the temporal arteries. Logically help may be expected from surgical interference with the sensory nerve supply to branches of the external carotid artery.

PERSISTENCE IN TREATMENT

The physician who undertakes the treatment of either migraine or epilepsy must prepare for a long campaign and must exercise and develop in his patient the gifts of patience, resourcefulness and hope. No matter how happy the patient may be because of the termination of single attacks, the physician has no right to rest on his oars. The eradication of the cause must still be the goal. In the electroencephalogram we have a laboratory measurement of the patient's progress. Probably supervision and treatment should continue so long as brain waves are abnormal. The physician who treats either of these stubborn conditions is justified in offering his patient the consolation of hope. In the last few years, the study of migraine and of epilepsy has brought a better understanding of the mechanisms involved and of new therapeutic agencies. Continued cultivation of this field should yield further fruit.

SUMMARY

The genetic relationship of epilepsy and migraine and certain methods of treatment are discussed, particularly the use of ergotamine tartrate (Gynergen) in migraine and sodium diphenyl hydantoinate (Dilantin Sodium) in epilepsy.

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DISCUSSION

DR. CARLETON R. METCALF, Concord: Is oxygen of value in migraine?

DR. LENNOX: I think it may be, if given over long periods. You refer, probably to the report from the Mayo Clinic, where a special type of inhaler has been constructed. In our clinic, Dr. von Storch has secured the apparatus and finds that certain patients are helped by prolonged inhalation of 100 per cent oxygen. Oxygen causes a constriction of cerebral arterioles, which may explain its beneficial action.

DR. W. J. P. DYE, Wolfeboro: In the use of ergotamine tartrate, how long does the effect of the drug last and how often does it have to be repeated?

DR. LENNOX: The drug aborts the attack—that is, it stops the pain and other symptoms, and the patient is over that particular attack. It needs to be repeated when the next attack comes along, which may be in a month or may be the next day. When attacks recur several times a week, the doctor is a good deal concerned to know whether repeated doses of ergotamine tartrate might produce arterial spasm and gangrene. We have had no such trouble in our cases and many of the patients have taken the drug for several years, several times a week and sometimes even daily without any worse symptoms than some tingling of the fingers. Patients should be observed closely for any effect on blood pressure and on the circulation of the extremities.

A PHYSICIAN: Does allergy have much effect on migraine, or is its alleged action purely psychological?

DR. LENNOX: Migraine has been defined by some as an

allergic condition. We, however, have seen no more allergy in our patients than in the general population, nor have we seen success in treatment along allergic lines. I am not convinced that allergy plays a part either in migraine or in epilepsy.

A PHYSICIAN: What is the action of Dilantin? Also, can the electroencephalogram of petit mal be differentiated from that of grand mal?

DR. LENNOX: Dilantin does not act as a general sedative but just how it works is for future research. It has an effect on the electrical waves of the brain though often times the extent of the improvement of brain waves does not parallel the improvement in symptoms. The electroencephalogram during grand mal is characterized by fast, spiky waves, and during petit mal by alternately fast and slow waves. Behind the different rates of brain waves are differing chemical states of the brain. Patients having only grand mal seem to have a high carbon-dioxide content of arterial blood, and those with only petit mal a low one.

A PHYSICIAN: Do you think that epileptic patients should be allowed to marry?

DR. LENNOX: The factor of inheritance is probably no greater in epilepsy than it is in diabetes or cancer or perhaps tuberculosis. Epileptic patients should not be singled out. A person with epilepsy may have highly desirable qualities along with it. An epileptic patient has one out of forty near relatives who are epileptic—the non-epileptic patient has one out of two hundred. As I have explained, the normal "carriers" of epilepsy are as important genetically as the epileptic patient. If the latter will choose a mate whose brain waves are normal, the chance of having an epileptic person among his descendants is greatly reduced; this will probably not occur for many generations.

A PHYSICIAN: Does the water balance have any effect?

DR. LENNOX: Yes. In certain patients, limitation of fluid—the dehydration treatment—seems to be of value.

A PHYSICIAN: What about the salt free diet?

DR. LENNOX: That is of value only when giving bromides. With a limited chloride intake, bromides are more readily retained by the body and therefore not so much bromide needs to be given. A salt free diet merely reduces the patient's bill at the drugstore.

URINARY INFECTIONS IN INFANTS AND CHILDREN*

BENJAMIN W. CAREY, M.D.†

DETROIT

THIS paper proposes to point out some of the important contributions to the knowledge of renal damage resulting from chronic urinary infections, the principal causes of pyuria and urinary infection, the important steps in the diagnostic approach to a patient with pyuria, and an outline of therapy. The recognition of congenital anomalies and infection in the urinary tract has become such a vital part of the diseases of infants and children that it is desirable for us to review certain phases of the problem. The impetus to this situation has developed first and chiefly from the emphasis placed on chronic urinary infections as a cause of renal damage and hypertension in childhood, adolescence or adult life, second, from the development of better methods of diagnostic approach to the genitourinary tract, and third, from the use of the newer therapeutic agents, mandelic acid and sulfanilamide.

Longcope and Winkenwerder¹ were among the first to report hypertension in the uremic stage of cases of chronic pyelonephritis. Butler² called attention to the facts that hypertension may be associated with pyelonephritis before there is demonstrable diminution in renal function and that hypertension secondary to unilateral pyelonephritis may disappear after removal of the involved kidney. The problem of hypertension associated with chronic pyelonephritis has been thoroughly studied by Weiss and Parker.³ These writers emphasized many important facts, such as the following: pyelonephritis is probably responsible for at least 15 or 20 per cent of cases of malignant hypertension, chronic or healed pyelonephritis occurs more frequently than does chronic glomerulonephritis, the hypertension of pyelonephritis can be independent of the activity of the renal infection, and often advances when the disease is in the healed stage, pyelonephritis is one renal disease that lends itself to effective treatment in its incipient stage. The things to remember from these excellent studies are that, first, every patient with an infection in the urinary tract should be subjected to thorough diagnostic study in order to find a possible congenital or acquired cause underlying the infection, second, adequate treatment of the infection and its cause should be instituted, and third,

careful follow up of every patient should be maintained, so that a recurrence of the infection may be promptly handled and subsequent renal damage be prevented.

DIFFERENTIAL DIAGNOSIS OF URINARY INFECTIONS

It is relatively unimportant to elaborate in detail the various clinical conditions that infection in the urinary tract may simulate, as there are many textbooks readily consultable for a complete discussion. The presence of an unexplained fever, abdominal pain, even vomiting or diarrhea, or symptoms referable to the genitourinary tract such as frequency, dribbling, enuresis or painful urination, should lead one to suspect infection in the urinary tract, and to institute proper steps to confirm or rule out such a diagnosis.

URINALYSIS

The finding of leukocytes or bacteria or both in a centrifuged specimen of urine usually suffices to establish the diagnosis of pyuria or infection in the urinary tract. However, this statement must be qualified and analyzed. During the course of many acute infections in locations other than the genitourinary tract, it is not uncommon to find a few leukocytes in the urinary sediment after rapid centrifugation. Certainly such a finding does not signify infection in the urinary tract. The specimen of urine must always be examined immediately after it has been obtained, specimens allowed to stand in open, unsterile containers at room temperature may rapidly develop a heavy growth of contaminating bacteria. Routine urinalysis, performed by a laboratory technician unfamiliar with the patient, may give one a false impression as to the importance of elements in the urine. It is always necessary to examine repeated specimens before establishing the diagnosis of pyuria or infection in the urinary tract, preferably obtained by catheterization in girls and after careful cleansing of the penis in boys. The physician should examine the specimen of urine himself rather than rely on the word of another. It should be remembered that a negative sediment from a single uncentrifuged urine specimen does not exclude the presence of pathologic elements in the urine. In the event that abnormal elements are found in the sediment, anomalies or infection in the vagina or urethra should be excluded before proceeding further with the investigation.

*Presented at the New England Postgraduate Assembly, Cambridge, Massachusetts, November 1, 1939. From the Children's Hospital of Michigan and the Department of Pediatrics, Wayne University College of Medicine, Detroit.

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CAUSES OF PYURIA AND URINARY INFECTION

There are many congenital and acquired factors that may be the direct or indirect cause of pyuria and urinary infection. The most important of them are as follows:

Pyelonephritis
Hydronephrosis
Calculi in the kidney, ureter, bladder or urethra
Renal tuberculosis
Renal tumor
Perineal infection, such as tuberculosis of the spine
Aberrant vessel obstructing the ureter or some other portion of the urinary tract
Ureteral kink
Penurethral infection
Hydroureter
Ureteral stricture
Diverticulum of bladder or urethra
Neuromuscular disease of bladder
Congenital valves at the ureteral orifices
Ureteral meatus stricture
Bladder tumor
Cystitis
Obstruction of the neck of the bladder
Prostatitis
Hypertrophy of the verumontanum
Congenital valves in the posterior urethra
Penurethral infection
Urethritis and stricture
Stenosis of the prepuce or urethra
Cervicitis
Foreign body in the vagina
Vaginitis

DIAGNOSIS OF PYURIA AND URINARY INFECTION

The first step in securing information as to the presence of a urinary infection, after excluding anomalies or infection of or about the external genitalia, is to obtain a catheterized specimen of urine for microscopic examination and culture in order to determine the causative organism. Catheterization will furnish information as to the volume of residual urine, and may help to exclude the presence of a posterior urethral anomaly.

The next step is to secure a flat roentgenogram of the abdomen including the bladder. This procedure may give information as to the size of the kidneys, and the presence of large intra-abdominal masses or calculi in the urinary tract. As a measure of kidney function, valuable information may be secured by determining the blood pressure and the nonprotein nitrogen in the blood.

These procedures may be quite adequate if the infection is the initial attack or is secondary to some other infection such as pneumonia but in the event of recurrent attacks of infection or an infection of long duration, further studies of the urinary tract and function of the kidneys are desirable. These should include a test for the concentrating power of the kidneys and an intravenous pyelogram, if evidence is at hand of dimin-

ished kidney function or anomalies in the urinary tract, it may be necessary to obtain a urea clearance test, and to perform a cystoscopy and obtain retrograde pyelograms. If the infection is the patient's first attack, and it has been demonstrated that the kidneys have normal concentrating ability and that the blood nonprotein nitrogen, blood pressure and intravenous pyelograms are normal, medical treatment may be instituted without performing cystoscopy and retrograde pyelography.

If unsatisfactory evidence has been obtained from intravenous pyelography, a cystogram may be done prior to retrograde pyelography. Information may be secured from this procedure as to the presence of a diverticulum of the bladder, tumor of the bladder or post-urethral obstruction.

Indications for cystoscopy may include evidence from intravenous pyelography of impaired function of one kidney or a portion of a kidney, absence of a part of the urinary tract, evidence of an anomaly of the bladder or urethra, and the necessity of examining and culturing the urine and determining the function of each kidney separately. However, if inoperable bilateral anomalies or abnormalities are observed in the intravenous pyelograms, or if the kidney function is markedly diminished, cystoscopy may be contraindicated.

In order to obtain successful intravenous pyelograms in children, certain general principles must be followed. It is necessary to restrict the fluid intake for some hours preceding injection of the dye so as to obtain a specific gravity of at least 1.020 in the urine, in order that the dye may be sufficiently concentrated to give proper visualization of the urinary tract. The presence of an excess amount of gas in the small intestine will obscure the dye in the urinary tract, and measures must be taken, such as mild laxatives, cleansing enemas or even drugs, to increase intestinal peristalsis and control excessive amounts of gas. A roentgenogram of the abdomen should be taken prior to injection of the dye, and if excessive amounts of gas are seen the procedure should be postponed until the gas can be eliminated. The dose of the intravenous dye should be adequate, and it should be remembered that the dose for infants is larger than that for older children.

The following list presents in summarized form the essential diagnostic procedures in the study of a patient with pyuria or urinary infection.

1. Examination of the external genitalia for the presence of congenital anomalies, inflammation, purulent discharge or foreign body.
2. Urinalysis (voided specimen unless the patient is a girl with a vaginal discharge).
3. Catheterization (urethral anomalies, residual urine, urinalysis and culture of urine).

- 4 Kidney function tests
 - a Blood pressure.
 - b Concentration test (the specific gravity of the urine should be at least 1 020)
 - c Nonprotein nitrogen of the blood.
 - d Urea clearance test if a, b or c are abnormal
- 5 Roentgenogram of the abdomen
- 6 Intravenous pyelogram.
- 7 Cystogram (especially if bladder abnormalities are suspected)
- 8 Cystoscopy
 - a Appearance of the urethra and bladder
 - b Ureteral catheterization, to determine the function of each kidney separately, culture and examination of urine from each kidney separately
 - c Instillation of dye for roentgenograms

The importance of the early recognition and treatment of congenital anomalies producing obstruction in the urinary tract and subsequent renal damage should be emphasized. The following case demonstrates how rapidly renal damage may occur following an obstructing congenital anomaly.

W B, a male infant, 3 months of age, was admitted to the hospital on June 20, 1939, with the chief complaints of difficulty in feeding and increasing pallor of the skin since birth. The birth was normal, and the birth weight was 8 pounds. The patient was given an evaporated milk formula but frequently refused it. Vomiting occasionally occurred after the feeding. Several changes were made in the formula, but the refusal and vomiting continued. The mother noted that the infant's skin had become increasingly pale since birth and that he seemed "feverish" frequently during the month preceding admission. Two weeks prior to entry a severe cough developed, which was spasmodic in character and was occasionally followed by vomiting. The infant seemed to be dyspneic for about 2 weeks prior to entry.

Physical examination revealed a fairly well-nourished infant with marked pallor of the skin who appeared acutely ill. The weight was 11½ pounds. The respiratory rate was increased, and the rectal temperature 101°F. The remainder of the physical examination was essentially negative except the abdomen. In the latter there was moderate distention, and a large, smooth, hard mass, which did not move with respiration, was palpable in the right flank. The tip of the spleen was palpated at the left costal margin.

Urinalysis (voided specimen) showed a clear, yellow urine without the presence of albumin, sugar or acetone, and no leukocytes, erythrocytes or casts in the sediment.

Examination of the blood revealed the presence of a severe secondary anemia. Other laboratory procedures were negative.

A roentgenogram of the chest showed considerable pneumonic infiltration in the central lung fields, with extension into both upper lobes. A film of the abdomen was unsatisfactory owing to obscuration by distended loops of intestine.

The patient received a blood transfusion the day following admission, and treatment of the pneumonia with sulfapyridine was instituted. However, his condition became steadily worse. The signs of pneumonia progressed. The rectal temperature varied between 99 and 105°F. It was suspected that the mass palpated in the right flank was an enlarged kidney, but because of the gravity of the condition, further diagnostic procedures, such as kidney visual-

ization and renal function tests, were not attempted. Death occurred on the 5th day.

An autopsy revealed the presence of enlarged kidneys, the right being larger than the left, and on section extensive hydronephrosis and pyonephrosis were seen, with almost complete destruction of the substance of the kidney. Both ureters were markedly dilated and the bladder wall was hypertrophied. On section of the posterior urethra the verumontanum was found to be hypertrophied and practically filled the lumen of the urethra. The lungs showed extensive bilateral pneumonic infiltration and patches of consolidation.

Although the immediate cause of death in this patient was the pneumonia, undoubtedly the obstruction in the urethra was the primary factor in the chain of events leading to the chronic urinary obstruction and infection, the renal destruction, the secondary anemia and, finally, the pulmonary infection and death. An interesting and important point for emphasis was the normal urinalysis on the day of admission. This confusing finding may occasionally occur, and demonstrates the necessity of repeated examinations of the urine before excluding the diagnosis of pyuria.

TREATMENT OF URINARY INFECTIONS

Many drugs have been used in the treatment of infections in the urinary tract. With the advent of mandelic acid and sulfanilamide these drugs have almost entirely replaced the older urinary antiseptics, and most of the latter are now only of historical interest. Both sulfanilamide and mandelic acid are necessary in therapy, as each drug possesses peculiar advantages.

In considering the use of mandelic acid it is necessary to remember that prolonged urinary infection or the presence of congenital abnormalities in the urinary tract may result in marked renal damage, this in turn will not allow sufficient con-

TABLE 1 Dosage of Mandelic Acid and Fluid Restriction According to Age

| AGE | TOTAL FLUID EACH 24 HOURS | MANDELIC ACID (DAILY DOSE) |
|---------|---------------------------|----------------------------|
| yr | cc | grm |
| Under 1 | 450 | 3 |
| 1-2 | 500 | 4 |
| 3-6 | 500 | 5 |
| 6-9 | 600 | 6 |
| 9-12 | 800 | 8 |

centration of the urine, and the proper degree of urine acidity will not be attained. The drug is administered in the form of a 10 per cent elixir of ammonium mandelate. The total daily dose is estimated so that a 1 per cent concentration of mandelic acid in the urine may be constantly maintained. It is necessary to restrict the fluid intake of the patient in order to maintain this concentration. Table 1 shows the fluid restriction and daily dose of mandelic acid for various age groups.

The acidity of the urine should be checked daily in order to make sure that the pH is at the necessary level of 5.5 or below, using chlorphenol red as the indicator. Occasionally it may be necessary to supplement the mandelic acid with a daily dose of an acid salt, such as ammonium chloride, in order to obtain a urine that is sufficiently acid. The sediment of a centrifuged specimen should be examined daily to detect the appearance of erythrocytes or casts. If these elements appear, having been previously absent, an irritant effect of the mandelic acid on the kidney may be occurring and the dose of the drug must be reduced or discontinued promptly. The mandelic acid should be continued for at least a week after the urine culture has become sterile. A limit of three weeks is placed on the continuation of therapy, because if sterilization of the urine has not occurred within this time it is not likely to occur by prolongation of therapy. Mandelic acid is effective against infections caused by organisms of the colon bacillus group and by *Streptococcus faecalis*. The drug is not effective against infection due to *Bacillus proteus* because this organism is always accompanied by an alkaline urine, and it is impossible to attain the proper acidity of the urine necessary for bactericidal action by the mandelic acid.

Sulfanilamide should be administered orally, accompanied by equal or larger doses of sodium bicarbonate. The dosage of sulfanilamide is usually 1 gr per pound of body weight every twenty-four hours. It is desirable to attain a concentration of free sulfanilamide in the urine of 100 to 300 mg per 100 cc., and to maintain the alkalinity of the urine at pH 7.4 or above. The pH can be easily checked by testing a specimen of urine with phenol red as the indicator. As it is difficult to obtain complete twenty-four hour collections of urine from infants and small children for sulfanilamide determination, it is simpler to maintain the blood concentration of free sulfanilamide at a level of 10 to 12 mg per 100 cc. A slight restriction of the fluid intake is desirable in order to maintain the correct urine concentration of sulfanilamide. In infants the daily fluids should be limited to 400 or 500 cc., and in older children to 1000 or 1200 cc. A culture of the urine should be obtained about three days after the sulfanilamide has been started, and at intervals of two or three days until the culture remains sterile. The full dosage should be maintained for at least two days after the culture becomes sterile, then decreased to about half the original amount, and continued for two or three days in order to prevent recurrence of the infection.

The patient should be observed daily for evidence of toxic reactions to the sulfanilamide, such as fever, a skin rash, hemolytic anemia, leukopenia, headache and mental confusion, nausea and vomiting and abdominal pain. If any of these reactions occur, it is desirable either to reduce the dose of the sulfanilamide or to discontinue it. Sulfanilamide is effective against infections caused by organisms of the colon bacillus group, staphylococci, beta hemolytic streptococci, *B. proteus* and a few strains of *Streptococcus faecalis*. Sulfanilamide has one distinct advantage over mandelic acid in that it may be administered during the acute febrile stage of the urinary infection.

A brief summary of the dosage and plan of administration of sulfanilamide is as follows:

Dose of sulfanilamide 1 gr per pound of body weight every 24 hours.

Dose of sodium bicarbonate 1 gr or more per pound of body weight every 24 hours.

Total fluid intake every 24 hours

Infants not over 400 to 500 cc.

Children not over 1000 to 1200 cc.

Urine pH 7.4 or higher

Sulfanilamide concentrations

Urine, 100 to 300 mg. per 100 cc.

Blood, 10 to 12 mg. per 100 cc.

SUMMARY

Neglected cases of pyuria and urinary infection may result in severe renal damage and malignant hypertension.

The diagnosis of pyuria or infection in the urinary tract must be made with proper clinical and laboratory procedures.

Completeness of examination of the genitourinary tract must be emphasized.

Adequate therapy of the urinary infection with mandelic acid or sulfanilamide or both, following proper bacteriological study of the organism responsible for the infection, must be instituted, and maintained until repeated cultures of the urine prove that the infection is cured.

Thorough follow-up of patients examined and treated for urinary infections must be maintained. Recurrences of the infection may occur even after apparent successful treatment, and it is important to relieve the kidneys of further assaults as promptly as possible.

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INGUINAL HERNIORRHAPHY IN THE AGED[†]

An Analysis of One Hundred Consecutive Cases In Patients Over Sixty-Five Years of Age

THOMAS B. QUIGLEY, M.D.[†]

BOSTON

IN A previous communication,¹ attention was called to the rapid increase in the proportion of aged persons in the population and to the fact that, in the near future, an increasing number of aged individuals can be expected to present themselves with conditions requiring surgical treatment.

Inguinal hernia, since not only its frequency but its danger increases considerably with each decade (Figs. 1, 2 and 3), becomes a surgical condition of

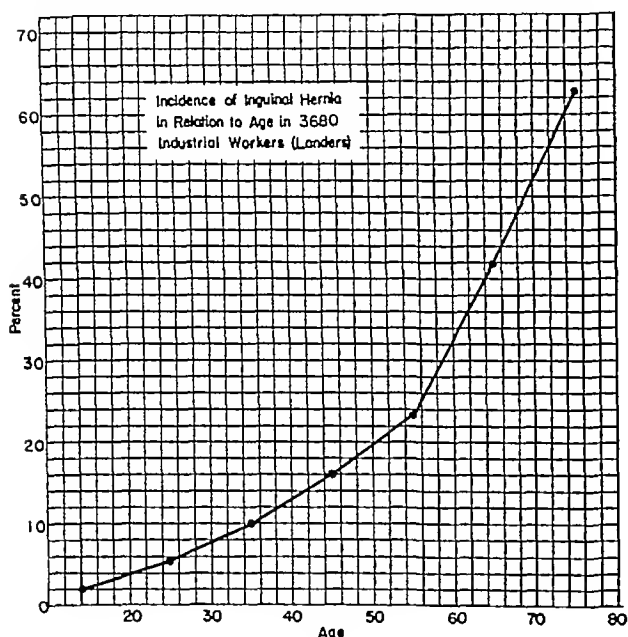


FIGURE 1

Curve constructed from figures given by Landers (*Age incidence of hernia* Indust. Med 7 671, 1938)

particular interest in the aged. Also, the analysis of a series of cases is facilitated by the standardization of the operative procedures employed in its repair.

One hundred consecutive cases in patients over the age of sixty-five were studied from the records of the Peter Bent Brigham Hospital. The average age was 69.8 years. The series included 96 men and 4 women. One hundred and thirty-four hernias were repaired in one hundred and ten operations through one hundred and thirty incisions. There were almost exactly the same number of right and left hernias. The proportion of indirect

to direct was approximately two to one. Eight were recurrences after previous operations. In 30 cases there were bilateral hernias. Four sliding hernias occurred in the series—three left and one right. One operative death occurred, due to pulmonary embolism. The patient, a seventy-five year-old man, succumbed on the twenty-third day after the second of two elective operations carried out under local anesthesia for bilateral hernias. There had been symptoms of pulmonary infarction on the tenth and eighteenth days. The diagnosis was confirmed by necropsy.

In 10 cases operation was imperative, for incarceration in 7 and for strangulation in 3. All the patients recovered, only 3 developed complications: one developed a severe cough, in another case the wound became tender and indurated, and the third patient was disoriented for twenty-four hours after operation.

With regard to the remaining 90 patients, for whom operation was an elective procedure, the reasons for seeking surgical aid are of interest. Twenty of these were undoubtedly influenced by one or more episodes of incarceration, but for the great majority the hernia appears to have become simply an intolerable chronic inconvenience. Of 67 patients who had worn a succession of trusses for an average of 9.4 years, only 12 were satisfied with their appliances at the time of admission to the hospital. In one case the truss had produced a considerable degree of ulceration of the skin. Although operation was delayed until this had healed, the patient developed the only gross wound infection in the series.

In many cases the annoyance of the hernia, from the patient's point of view, outweighed the manifestations of much more serious disease. This is well illustrated by the following case.

J. Y., a 73-year-old laborer, was referred to the Medical Service for the treatment of decompensated heart disease. On admission there was found to be marked enlargement of the heart, auricular fibrillation, pulmonary congestion and peripheral edema. The blood pressure was 200/110. There was also a football-sized, right, direct hernia, which was difficult to reduce. Two weeks after admission, improved by rest and digitalization, the patient requested that the hernia be repaired, since it had always been an encumbrance and no truss had ever kept it reduced. After some deliberation operation was carried out under local anesthesia. At the time of operation, fibrillation, pulmo-

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nary congestion and peripheral edema were still present. The procedure required more than 2 hours. Fine silk sutures were used throughout. The postoperative course was entirely uneventful save for mild disorientation for about 24 hours. The patient was discharged improved

One hundred and twenty five chronic or degenerative illnesses were distributed among the remaining 85 patients. These are listed in Table 1, together with the postoperative complications that

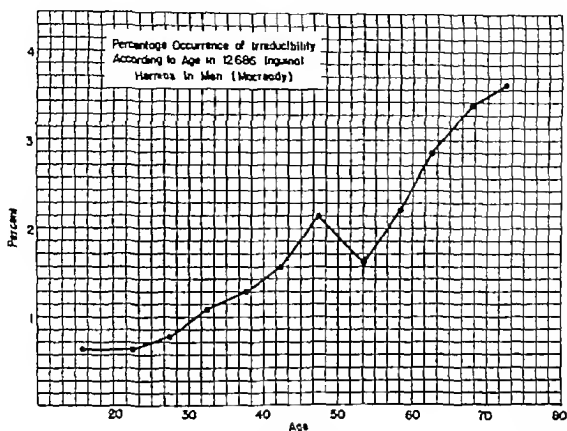


FIGURE 2.

Chart constructed from figures given by Macready (*A Treatise on Rup-tures*, 442 pp Philadelphia Blakiston Son & Co 1893)

20 days after operation. Death due to cardiac failure occurred suddenly 6 months later. There was no recurrence of the hernia.

Any consideration of surgery in the aged must involve a careful evaluation of chronic or degen-

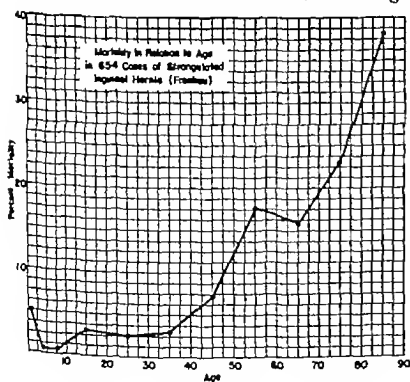


FIGURE 3.

Chart constructed from figures given by Frankau (*Strangulated hernia a review of fourteen hundred and eighty-seven cases* Brit. J Surg. 19 176-191 1931)

erative disease other than that for which operation is performed. Only 15 of the 100 patients studied were found to be entirely free from other disease.

could reasonably be attributed to them. The great majority could be classified among benign prostatic hypertrophy (or a history of previous prostatectomy), cardiovascular degeneration and chronic

TABLE 1 Relation of Concomitant Disease to Postoperative Complications

| CONCOMITANT DISEASE | NO. OF CASES | REFERABLE POSTOPERATIVE COMPLICATIONS | |
|--|--------------|---------------------------------------|-------------|
| | | NO. OF CASES | PERCENT AGE |
| Benign prostatic hypertrophy (or previous prostatectomy) | 40 | 3 | 8 |
| Cardiovascular degeneration | 26 | 3 | 11 |
| Chronic pulmonary disease | 23 | 2 | 9 |
| Miscellaneous | 36 | 9 | 25 |

pulmonary disease, all with relatively few referable postoperative complications. Included in the 36 cases of miscellaneous disease are sixteen diseases ranging from diabetes mellitus to hemochromatosis. Nine, or 25 per cent, of these patients developed referable postoperative complications.

Local novocain was the most frequently employed anesthetic in the series, and had the lowest incidence of postoperative complications. Nitrous oxide and oxygen, ether and spinal novocain followed in order of usage (Table 2). There was no correlation between the use of novocain and wound infections, possibly because nerve blocking after the method of Cushing² was almost invia-

aged patient when carried out under novocain nerve-block anesthesia, with the minimum of pre-operative medication and with fine silk as the suture material

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CHRONIC BRUCELLOSIS*

1 The Incidence of Chronic Undulant Fever in Rhode Island

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PROVIDENCE, RHODE ISLAND

A STUDY of over 4000 individuals in Rhode Island during the past four and a half years has revealed in 441, or about 10 per cent, clinical and laboratory evidence supporting a diagnosis of chronic brucellosis. Seven hundred and ninety-nine (18 per cent) had positive reactions to one of the following three tests: intradermal, intramuscular, agglutination. The 441 who had clinical evidence of chronic brucellosis showed positive reactions to at least two of these tests.

A positive reaction to any of the tests used in making a diagnosis of undulant fever should make one suspicious of its presence. According to Evans, Robinson and Baumgartner,¹ a positive agglutination test is more reliable than a positive skin reaction. They found the opsonocytophagic reaction to be the least reliable of the specific tests, of which the intracutaneous test is probably the least standardized. Various antigens have been used, such as heat-killed bacteria, a filtrate of an extract of the ground bacterial cells, a filtrate of old cultures and a lipid-free antigen. Moreover, the amount and dilutions used for testing have not been uniform. In spite of these differences, the percentage of positive reactions has been high in the skin tests, as well as in the other tests used in various sections of this country. It is generally recognized that the greater and more frequent the contact which man has with infected animals, the greater the percentage of positive reactions, no matter which of the tests is used.

Goldstein, Fox and Carpenter² found that 10.1 per cent of 332 unselected hospital patients gave positive intradermal reactions. They used a clear

culture filtrate containing 13.3 mg of nitrogen per 100 cc, injecting 0.1 cc of a 1:100 dilution. Angle, Algie, Baumgartner and Lunsford³ obtained positive reactions in 9 per cent of 712 school children. They used Huddleson's "brucellergin" for the intradermal tests.^{3,4} They found, moreover, an increasing percentage of positive cutaneous reactors in successive age groups up to early adulthood. The lowest percentage of positive reactions was found in negro children. Levin⁵ tested 365 individuals, and found that of the 27 (7 per cent) having positive skin reactions, 15 showed clinical evidence of chronic brucellosis. He used a fat-free ground bacterial suspension containing 0.004 mg dry bacterial protein per 0.2 cc. Meyer and Geiger⁶ found cutaneous reactions in 10 per cent of a group of medical students and in 60 per cent of a group of veterinarians. Gersh and Mugrage⁷ submitted 491 hospital patients to the skin test and obtained positive reactions in 12 per cent. This was a much higher percentage than he found in the agglutination test, which was positive in only 1.2 per cent of 5000 cases.

There have been a number of reports on agglutination tests for the presence of brucella antibodies. A few of these are given to indicate the wide variation. Hunt and Noll⁸ found that 8.9 per cent were positive in 1000 samples of blood serum tested. They considered reactions below a 1:80 dilution without significance. Giordano and Ableson⁹ carried out agglutination tests on 1100 human serums which had been submitted for Widal or Wassermann tests or for chemical analysis, and found that 5.7 per cent had positive tests. Dolman and Hudson¹⁰ tested 5068 specimens of

*This is the first of a series of articles on chronic brucellosis.

†Visiting physician, Rhode Island Hospital, Providence.

‡Assistant visiting physician, Rhode Island Hospital, Providence.

§The clinical findings in these cases will be discussed in a later paper.

nary congestion and peripheral edema were still present. The procedure required more than 2 hours. Fine silk sutures were used throughout. The postoperative course was entirely uneventful save for mild disorientation for about 24 hours. The patient was discharged, improved.

One hundred and twenty five chronic or degenerative illnesses were distributed among the remaining 85 patients. These are listed in Table 1, together with the postoperative complications that

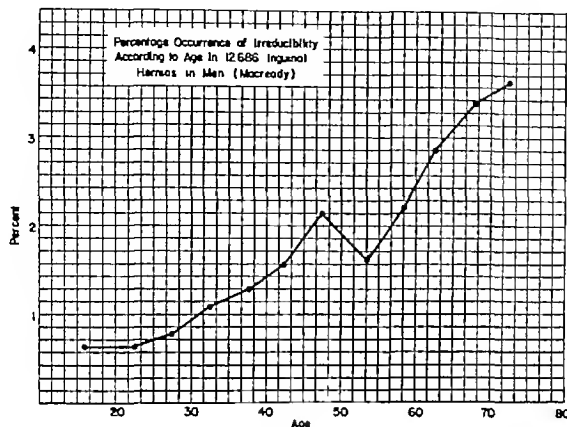


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Local novocain was the most frequently employed anesthetic in the series, and had the lowest incidence of postoperative complications. Nitrous oxide and oxygen ether and spinal novocain followed in order of usage (Table 2). There was no correlation between the use of novocain and wound infections, possibly because nerve blocking, after the method of Cushing² was not

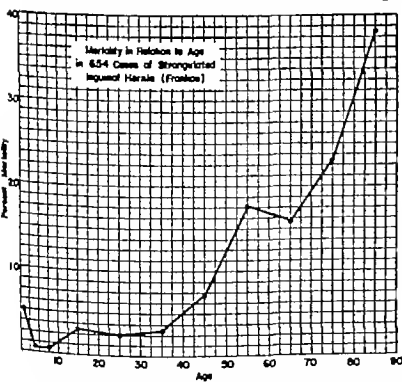


FIGURE 3

Chart constructed from figures given by Frankau (*Strangulated hernia: a review of fourteen hundred and eighty-seven cases* Brit. J Surg 19 176-191 1931)

erative disease other than that for which operation is performed. Only 15 of the 100 patients studied were found to be entirely free from other disease.

bly practiced, rather than infiltration of the tissues at the operative site. Ether was used for both the patients in the series who developed septic wounds.

The appendix was removed three times without complications. Orchidectomy was carried out five times, one patient developed a small scrotal hema-

TABLE 2 *Anesthesia in Relation to Postoperative Complications*

| ANESTHETIC | NO. OF OPERATIONS | TOTAL POSTOPERATIVE COMPLICATIONS | | POSTOPERATIVE COMPLICATIONS REFERABLE TO ANESTHETIC | |
|--------------------------|-------------------|-----------------------------------|--------------|---|--------------|
| | | NO. | PER CENT AGE | NO. | PER CENT AGE |
| Local novocain | 58 | 19 | 33 | 3 | 5 |
| Ether | 21 | 13 | 62 | 3 | 14 |
| Nitrous oxide and oxygen | 15 | 6 | 40 | 1 | 7 |
| Spinal novocain | 14 | 7 | 50 | 2 | 14 |

toma. Autogenous fascia was used eight times in the repair of a hernia. One of these patients developed a thrombophlebitis.

In 2 cases, herniorrhaphy was carried out at the same time as perineal prostatectomy. One of these patients developed ecchymosis of the scrotum, and the other was irrational for the first twenty-four hours after operation. In 2 other cases herniorrhaphy was carried out during convalescence from prostatectomy, and 1 patient's hernia was repaired while he was being prepared for prostatectomy. None of these patients developed complications. Hemorrhoidectomy was performed immediately after herniorrhaphy in 1 case without

operated in the remaining 21 patients whose hernias were repaired at a single operation.

Excision of a hydrocele was combined with herniorrhaphy in 10 cases. Five of these patients developed wound complications—2 suppurative and 3 nonsuppurative. In both the former and 2 of the latter, catgut sutures were used throughout. In no operation in which fine silk was used was there a suppurative complication. In fact, of all the factors associated with the operation which might contribute to postoperative wound compli-

TABLE 4 *Complications*

| COMPLICATION | NO. OF CASES | COMPLICATION | NO. OF CASES |
|----------------------------|--------------|-----------------------------|--------------|
| Gross infection | 1 | Thrombophlebitis | 2 |
| Superficial infection | 1 | Lymphangitis of lower leg | 1 |
| Induration of wound | 5 | Angina pectoris | 1 |
| Hematoma of wound | 3 | Auricular fibrillation | 1 |
| Hematocele | 3 | Cerebral hemorrhage | 1 |
| Edema of testis or cord | 2 | Cholangitis | 1 |
| Massive pulmonary collapse | 1 | Insulin reaction | 1 |
| Pulmonary embolism (fatal) | 1 | Peptic ulcer pain | 1 |
| Pulmonary infarctus | 1 | Urinary retention (requir | |
| Severe cough | 1 | ing catheterization) | 7 |
| Severe hiccough | 1 | Psychosis or disorientation | 7 |
| Abdominal distention | 3 | Total | 46 |

cations, the suture material was found to be the most important. There were nearly three times as many non-septic and septic wound complications when catgut was used as when fine silk was employed (Table 3).

Forty-six postoperative complications occurred in 41 patients, as shown in Table 4. While many of these complications may seem trivial and un-

TABLE 3 *Suture Material in Relation to Complications and Recurrence*

| SUTURE MATERIAL | NO. OF CASES | NO. OF HERNIAS | NO. OF INCISIONS | NO. OF HERNIAS EXAMINED AFTER 1 YEAR | RECURRENTS | | CASES DEVELOPING COMPLICATIONS OF ANY TYPE | | WOUND COMPLICATIONS | | | |
|-----------------|--------------|----------------|------------------|--------------------------------------|------------|-------------|--|-------------|---------------------|------------|-------|-------------|
| | | | | | NO. | PERCENT AGE | NO. | PERCENT AGE | SEPTIC | NON SEPTIC | TOTAL | PERCENT AGE |
| Silk | 58* | 76 | 73 | 45 | 3 | 7 | 23 | 41 | 0 | 5 | 5 | 7 |
| Catgut | 39* | 53 | 52 | 29 | 5 | 17 | 16 | 43 | 2 | 7 | 9 | 17 |
| Mixed | 5 | 5 | 5 | 2 | 0 | 0 | 2 | 40 | 0 | 1 | 1 | 20 |
| Totals | 100 | 134 | 130 | 76 | 8 | | 41 | | 2 | 13 | 15 | |
| Averages | | | | | 11 | | 41 | | | | | 11 |

*Two patients had silk sutures on one side and catgut on the other.

event. It would seem unwise to combine herniorrhaphy with other major surgery, but at the same time there does not appear to be any advantage in operating on multiple hernias in stages. In fact, the dangers of prolonged recumbency, notably bronchopneumonia and thromboembolic disease, may outweigh the possible advantages of avoiding a prolonged operation. Nine of the 30 patients who had bilateral hernias, or combinations of hernias requiring operation on both groins, were operated on in two stages. Five, or 55 per cent, developed complications, 1 terminating fatally. Exactly the same percentage of complications devel-

related to the operation, it seemed wisest to include everything that disturbed the postoperative course in the slightest as being at least potentially dangerous in this age group. No correlation could be discovered between complications and operating time, the type of operation or the experience of the surgeon. The low incidence of pulmonary complications is probably fortuitous, since the average time spent in bed after operation was fourteen days. However, activity in bed was encouraged and breathing exercises were frequently employed.

The frequency of postoperative disorientation

appears to be related to preoperative medication. Of the 7 patients exhibiting this complication, 5 were operated on under local or spinal novocain, reinforced with relatively large doses of morphine, scopolamine or barbiturates.

Contact was made with 79 patients one year or more after operation. Twenty four of these replied by mail that they had been benefited by operation and had no evidence of recurrence. This was regarded as highly unlikely, if not impossible, and therefore only the remaining 55 patients who were examined one year or more after operation by a member of the staff of the hospital were considered. There were eight recurrences (11 per cent) among the 76 hernias repaired in these patients, four direct and four indirect.

No correlation could be found between the incidence of recurrence and concomitant disease, the experience of the surgeon, the anesthetic or the age, weight or blood pressure of the patient. No recurrences developed among the patients who were operated on for incarceration or strangulation. More than twice as many recurrences occurred among the patients who developed postoperative complications (17 per cent) as among those whose convalescence was uneventful (7 per cent). Neither of the patients whose wounds became septic suffered a recurrence. The type of operation was apparently a factor in recurrence (Table 5). However, the radical Halsted proce-

20 patients of seventy or older with 1 death. Dulin⁵ concludes that the repair of inguinal hernia in the aged is not only relatively dangerous but unsatisfactory. He reports 301 patients sixty or older with a recurrence rate of 20.5 per cent and a mortality rate of 3.8 per cent. He found that 80 per cent of wounds became infected when local anesthesia was used, and 23 per cent when spinal anesthesia or nitrous oxide and oxygen was used. Sutures of No. 3 and No. 2 chromic catgut were used exclusively in this series.

The great importance of the suture material in relation to complications and recurrence after herniorrhaphy is now generally recognized. The recent experimental work of Meloney,⁶ Shambaugh and Dunphy,⁷ and others has been amply confirmed by such clinical studies as those of Parsons,⁸ Beckman and Sullivan,⁹ Burdick, Gillespie and Higinbotham¹⁰ and Shambaugh.¹¹ In every case the teachings of Halsted¹² have been vindicated, and fine silk has been found to be from every point of view the best suture material. The present study, although based on a relatively small number of cases, provides further evidence in support of this teaching, and demonstrates that inguinal herniorrhaphy, whether elective or imperative, is a reasonably safe and satisfactory procedure for the aged patient.

SUMMARY

One hundred consecutive cases were studied in which operation for inguinal hernia was carried out at the age of sixty-five or older. In 10 cases the operation was an imperative or emergency procedure, in the remaining 90 it was elective.

The operative mortality of the series was 1 per cent. One and seven tenths per cent of the one hundred and thirty incisions became infected. Ten and eight-tenths per cent of seventy six hernias examined one year or more after operation recurred.

Nearly three times as many wound complications and recurrences occurred when catgut was used as when fine silk was employed.

The same incidence of complications followed the repair of multiple hernias in stages as in a single operation.

Novocain nerve-block anesthesia was followed by the lowest incidence of postoperative complications. The Bassini type of operation was the most satisfactory from the point of view of recurrence. There was no correlation between the incidence of complications or recurrence and operating time, the experience of the surgeon, concomitant disease and the age, weight or blood pressure of the patient.

Inguinal herniorrhaphy, whether elective or imperative, is a safe and satisfactory procedure for the

TABLE 5 Type of Operation in Relation to Recurrence

| OPERATION | NO. OF HERNIAS | NO. EXAMINED AFTER 1 YEAR | RECURRENTS NO. | PERCENT |
|-----------|----------------|---------------------------|----------------|---------|
| Ferguson | 39 | 24 | 3 | 13 |
| Bassini | 44 | 26 | 1 | 4 |
| Halsted | 47 | 26 | 4 | 15 |
| Totals | 130 | 76 | 8 | — |
| Average | | | | 11 |

dures with subcutaneous transplantation of the cord was employed most frequently in patients with poor musculature and fascia, and therefore with a greater possibility of recurrence.

The most important single factor in recurrence appeared to be the suture material. The percentage of recurrence was nearly three times as great when catgut was used as when fine silk was employed (Table 3).

COMMENT

Grace and Johnson³ have pointed out that there is very little accurate information available concerning the results of herniorrhaphy in patients over fifty. They report 1032 patients with an incidence of infection of 4.95 per cent and a recurrence rate of 26.6 per cent. Brooks⁴ has reported

aged patient when carried out under novocain nerve-block anesthesia, with the minimum of pre-operative medication and with fine silk as the suture material

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CHRONIC BRUCELLOSIS*

1 The Incidence of Chronic Undulant Fever in Rhode Island

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A STUDY of over 4000 individuals in Rhode Island during the past four and a half years has revealed in 441, or about 10 per cent, clinical and laboratory evidence supporting a diagnosis of chronic brucellosis§. Seven hundred and ninety-nine (18 per cent) had positive reactions to one of the following three tests—intradermal, intramuscular, agglutination. The 441 who had clinical evidence of chronic brucellosis showed positive reactions to at least two of these tests.

A positive reaction to any of the tests used in making a diagnosis of undulant fever should make one suspicious of its presence. According to Evans, Robinson and Baumgartner,¹ a positive agglutination test is more reliable than a positive skin reaction. They found the opsonocytaphagic reaction to be the least reliable of the specific tests, of which the intracutaneous test is probably the least standardized. Various antigens have been used, such as heat-killed bacteria, a filtrate of an extract of the ground bacterial cells, a filtrate of old cultures and a lipid-free antigen. Moreover, the amount and dilutions used for testing have not been uniform. In spite of these differences, the percentage of positive reactions has been high in the skin tests, as well as in the other tests used in various sections of this country. It is generally recognized that the greater and more frequent the contact which man has with infected animals, the greater the percentage of positive reactions, no matter which of the tests is used.

Goldstein, Fox and Carpenter² found that 10.1 per cent of 332 unselected hospital patients gave positive intradermal reactions. They used a clear

culture filtrate containing 13.3 mg of nitrogen per 100 cc, injecting 0.1 cc of a 1:100 dilution. Angle, Algie, Baumgartner and Lunsford³ obtained positive reactions in 9 per cent of 7122 school children. They used Huddleson's "brucellergen" for the intradermal tests.^{3,4} They found, moreover, an increasing percentage of positive cutaneous reactors in successive age groups up to early adulthood. The lowest percentage of positive reactions was found in negro children. Levin⁵ tested 365 individuals, and found that of the 27 (7 per cent) having positive skin reactions, 15 showed clinical evidence of chronic brucellosis. He used a fat-free ground bacterial suspension containing 0.004 mg dry bacterial protein per 0.2 cc. Meyer and Geiger⁶ found cutaneous reactions in 10 per cent of a group of medical students and in 60 per cent of a group of veterinarians. Gersh and Mugrage⁷ submitted 491 hospital patients to the skin test and obtained positive reactions in 12 per cent. This was a much higher percentage than he found in the agglutination test, which was positive in only 1.2 per cent of 5000 cases.

There have been a number of reports on agglutination tests for the presence of brucella antibodies. A few of these are given to indicate the wide variation. Hunt and Noll⁸ found that 8.9 per cent were positive in 1000 samples of blood serum tested. They considered reactions below a 1:80 dilution without significance. Giordano and Ableson⁹ carried out agglutination tests on 1100 human serums which had been submitted for Widal or Wassermann tests or for chemical analysis, and found that 5.7 per cent had positive tests. Dolman and Hudson¹⁰ tested 5068 specimens of

*This is the first of a series of articles on chronic brucellosis.

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§The clinical findings in these cases will be discussed in a later paper.

blood and obtained 4.5 per cent positive agglutinations.

At the Rhode Island Hospital during 1937 and 1938, 372 serums sent to the laboratory for a Widal test were also tested for brucella agglutination, using a commercial antigen. Of this group 12 per cent had positive reactions in dilutions of 1:40 or bigger, and 9 per cent in dilutions of 1:80 or higher. However, only 78 cases of acute undulant fever have been reported in Rhode Island for the decade ending January, 1939.

Rhode Island is primarily an industrial state, only 1.3 per cent of its population being engaged in agriculture, as compared with 10.6 per cent in Vermont.¹¹ During the latter part of 1937, 62 per cent of the Rhode Island milk supply was produced at home, 20 per cent came from Connecticut, 16 per cent from Massachusetts and 2 per cent from Vermont.¹² Of the total milk supply available for sale in Rhode Island 76 per cent is produced for pasteurization and 24 per cent for sale as raw milk.¹³ In Providence in 1937, 92 per cent of the total milk sold was pasteurized and 8 per cent was raw. In Newport the percentage of pasteurized milk is even higher.¹⁴ All the milk imported from Vermont is pasteurized either at the source or within Rhode Island.

From May, 1936, to May, 1937, approximately 10 per cent of the cattle in Rhode Island were tested for Bang's disease. Approximately 10 per cent of those tested proved to be positive; an additional 10 per cent were suspicious.¹⁵ Because of the unusual characteristics of the brucella organisms and the ease with which all food products, including meats, eggs, butter, ice-cream, cheese, milk, fruits and vegetables may become contaminated, it is evident that milk should not be regarded as the commonest source of infection.^{16, 17} Except in rare cases where mastitis is present the organisms are not found in the milk even when the cows are known to be infected. The milk may, of course, be contaminated by careless handling. Brucella organisms have been isolated from hens, and all domestic animals have been shown to be carriers of this disease.¹⁸⁻¹⁷ It has also been found that the organisms may survive for a year or more in manure stored under ordinary New England farm conditions. There is no evidence, however, that they multiply except in infected animals. The prevalence of the brucella organism suggests that the infection may be almost universal in a given community and that only certain individuals become chronically ill.

Within the last two years the literature has been rich in articles dealing with the incidence, diagnostic procedures and treatment of various forms of infection with the brucella organism in

man. At the present time the nomenclature is rather confusing because the term "undulant fever" represents only those infections showing the characteristic temperature changes. In this country the typical undulating type of temperature in the acute infection is rarely seen. So far as our own experience is concerned, only 1 case showing the typical undulating fever has been encountered.

The clinical picture and course of the usual acute form of this infection is familiar to all and has been adequately described. There is, however, a mass of evidence supporting the contention that there is a definite chronic form of this infection in human beings, to which the term "brucellosis" may well be applied.

Nearly all the recent studies dealing with the diagnosis and incidence of chronic brucella infections have been carried on in groups of university students or school children or the inhabitants of various institutions that include the chronically ill in the later decades of life. In general, the incidence of this disease, in all groups studied, is in the neighborhood of 10 per cent. This figure is about that found in our group of private patients. It also holds true in our studies made of groups from outpatient departments, the medical wards, almshouse inmates and patients in a hospital for chronic mental diseases, where the same technique was used.

The present study of private cases deals with the people encountered in a practice limited to internal medicine, and obviously with a group of patients who voluntarily seek medical aid. The general relation between chronic brucellosis and personal allergy is significant. Of the private cases studied, 92 per cent had a history of allergy and all had a history of allergy in their immediate families. Those people showing active symptoms of the chronic infection are probably suffering from a hypersensitivity to *Brucella abortus*. The clinical behavior of these cases, when under treatment, indicates an allergic state rather than a lowered resistance. The reactions to varying concentrations of antigen solutions used in the intradermal test are consistent with a hypersensitive state. Individuals highly sensitive may react negatively to a strong antigen solution, but show a strongly positive intradermal reaction if very dilute solutions are used. This fact has also been observed by us in the intradermal reactions to solutions of various drugs, chemicals, alkaloids and bacterial proteins. Possibly this explains a part, at least, of the often reported discrepancies between intradermal and serum agglutination tests. The patients' chief complaints many times, have no apparent relation to this infection, but it must be remembered that as a group they are not well people. It is quite to be expected

that figures derived from such a group would not agree entirely with those obtained from groups of students or from studies made on blood sent to the laboratory for the Wassermann or Widal test

In this study, besides the clinical evidence, three distinct tests were used in establishing the diagnosis: the intradermal test, the serum agglutination test and the intramuscular test

The serum agglutination test, carried out on all cases regardless of history or clinical findings, was essentially that described by Carpenter, Boak and Chapman,¹⁶ with the following alterations: depression slides with sealed cover glasses were used instead of tubes. We found the wire loop for preparing the various dilutions, if handled with reasonable care, more rapid than and practically as satisfactory as the capillary pipettes or the rheometer. Sterile saline solution (0.85 per cent) was used for diluting fluid. All the glassware was chemically clean and sterile. The preparations were sealed with heavy oil, care being taken to prevent any contamination of the preparation. The work was carried out as rapidly as possible without interfering with accuracy, in order to prevent evaporation of the solutions. We found this necessary, for in tests carried out in overheated rooms or with opened windows and strong drafts, or with slow technic, evaporation sometimes altered the results in the more dilute preparations by over 25 per cent by the time the readings were made. Because of this no reliance was placed on any open-slide method.

With a little experience the depression slide technic proved to be a timesaver. A larger number of tests can be incubated in a much smaller space than is necessary for the tube technic. Instead of a series of dilutions from 1:15 to 1:405, the dilutions were carried on to about 1:10,000. Also, a series of slides was prepared in a similar manner but with the antigen diluted in one series to 1:10 and in another to 1:100, the serum dilutions being as in the first series. Also, a series was prepared using similar dilutions of serum and antigen. Thus all combinations of various dilutions of both antigen and serum are represented. Occasionally agglutination occurs only in higher dilutions of both antigen and serum. The result of a test varies depending on the time in the cycle of antibody production at which the sample is taken. We found many individuals showing a rather cyclic rise and fall in the serum titer. There may be in the host a variation in the degree of absorption of antigenic substances, or the response of the individual may be the variable factor. When this fact was established, a system of taking repeated specimens at two-week intervals was adopted, and if three negatives were obtained, two more

specimens were taken at three-week intervals. In some cases, positive tests were obtained only in this manner. Dilutions of 1:40 or higher were considered positive if one of the other tests was also positive.

The solution used for the intradermal test was a very dilute, fat-free aqueous solution derived from ground, heat-killed *Brucella abortus* (bovine, caprine and swine in equal proportions). The three dilutions used represented a protein solution equivalent to suspensions of 250,000, 25,000, and 2,500 bacteria per cubic centimeter. Only 0.02 cc. of each dilution was injected intradermally, thus the doses used represented, in protein, the equivalent of 5,000, 500 and 50 bacteria respectively. In a few of the obviously severe cases, even more dilute solutions were used. The amount used was minute, but in very sensitive cases small areas of superficial slough occurred even with the smallest doses. Often pigmented areas remained for six or more months. Any discolored area 5 mm. or more in diameter remaining after sixty hours was considered a positive reaction. The severity of the reaction did not seem to have any bearing on the serum titer, but did vary closely with the degree of sensitivity as shown by the clinical findings and reaction to therapeutic antigen. The intradermal reaction is a valuable guide in determining the proper dosage of therapeutic antigen.

The positive intramuscular test is determined by a rise in temperature to 100°F or more during the forty-eight-hour period following the intramuscular injection of 0.5 cc. of antigen solution. The material used was equivalent to 2,500,000 bacteria per cubic centimeter. The normal person shows no rise in temperature when many times the indicated dose is injected. It is unusual to find a noninfected person showing more than the slightest rise in temperature after the intramuscular injection of as much as 1 cc. of the commercial vaccine, concentrated to contain 2,000,000,000 bacteria per cubic centimeter.

Agglutination tests were carried out before any antigen was used intradermally or intramuscularly. It was found that intradermal tests made with the dilute antigen did not appreciably increase the serum titer. Strong concentrations of antigen and strong suspensions of the vaccine increased the titer somewhat, but for a period of only a few weeks. The titer is influenced by intramuscular tests, particularly if a strong antigen solution or heavy vaccine suspensions are used. The intramuscular test was depended on mainly when the agreement of the other tests was open to question. It always agreed with a negative intradermal test. In our hands the intramuscular test proved

very valuable, but the reactions sometimes induced were disturbing to the patient.

By this method of investigation any patient presenting clinical evidence as well as showing two positive tests of the three available was considered to have chronic brucellosis. Certain complaints and physical findings were always present, or had recently been present, in all cases showing the required positive laboratory tests.

Of our 441 positive cases, more than 50 per cent have been under observation for from two months to four and a half years. About 90 per cent of these patients followed the advised treatment. Less than 10 per cent either have been living at a distance or refused to believe that such a condition existed. This disbelief seems to arise from a dearth of available information on this subject.

CONCLUSIONS

We believe that chronic brucellosis is prevalent in southern New England. It is of economic importance because it is often a cause of disability sufficient to prevent normal physical activity among working people.

Many so-called neurasthenics are suffering from this condition. Its clinical aspect is varied, and puzzling to the patient and physician alike. It does not follow the usual course of chronic infection so much as it does that of a chronic allergic state. If we consider this condition from a standpoint of allergy, a more reasonable system of treatment would be desensitization.

Practical, simple and quite reliable methods of diagnosis are available and should be more generally utilized.

The general incrimination of raw milk as the chief source of brucellosis is subject to criticism, as the contamination through other food products and through other channels is of equal importance.

A plea is entered for more serious consideration of the victims of chronic brucellosis and for a more careful study of the disease.

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REPORT ON MEDICAL PROGRESS

ALLERGIC DISEASES

With Special Reference to Histamine and Acetylcholine

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WHY should histamine be regarded as the active end substance which results from many kinds of reactions and is, therefore, the immediate cause of asthma? The question was asked in the review¹ of last year, and demands a more detailed answer than the one there given.

In 1910, Barger and Dale² studied the poisons of ergot, and isolated beta iminazolyethylamine as one of them. They called it "histamine." They showed that histamine could cause contraction of the isolated uterus of the guinea pig when added to the bath in which the strip was suspended, and a marked fall in the cat's blood pressure when injected intravenously into the intact animal. These two effects are so characteristic that they are used today as measures of the concentration of histamine in unknown solutions. When histamine in tiny doses is injected intravenously into a guinea pig, severe bronchospasm develops at once, and the animal usually succumbs with signs and symptoms which are quite like those of anaphylactic shock. When histamine, even in high dilution, is applied to a scratch in the skin of animals and man, an immediate reaction with urticarial wheal and surrounding erythema develops within a few minutes.

On the basis of its physiologic effects, there is ample reason to suspect histamine as the ultimate active agent in anaphylactic and allergic reactions, and the theory that the substance is released from normal cells following injury by trauma or by a specific antigen-antibody reaction taking place in the cell surface is not unreasonable. However, as Best and McHenry³ ask, "Can such a potent substance be present in the active state in living tissue, and if so, what holds it in its place?" It is easy to show that extracts of many different tissues, as well as of such substances as ergot, yeast, peptone, casein and pituitary extract, have a depressor action on the cat's blood pressure or stimulate the guinea pig's intestinal strip, but it is not so easy to be sure that the activity of the extract depends on histamine. Fortunately it has been possible in many cases to identify the histamine by chemical means as the picrate. The first identification was the isolation of histamine from in-

testinal mucosa by Barger and Dale⁴ in 1911. Some years later, Abel and Kubota⁵ isolated histamine dipicrate from dried pituitary material, and so claimed that the uterus-stimulating factor in pituitary extract was nothing more or less than histamine. Now, however, it is recognized that pituitrin has a more specific action that does not include the flush, the low blood pressure and the vasodilatation produced by histamine.

Meantime, it was known from chemical studies that histidine is largely distributed through the body, and that histamine could be made from it by processes of oxidation as well as by the action of bacteria. This last possibility made it necessary to study tissues that were fresh and uncontaminated. It was not until 1927 that Best, Dale, Dudley and Thorpe⁶ prepared histamine in crystalline form from the normal liver, lung, spleen and muscle of the ox.

The properties of histamine are interesting. It is very poisonous, the quantities needed to kill by intravenous injection are extremely small, although the lethal dose varies among different animals. The guinea pig is killed by 0.30 mg per kilogram of body weight, while the rat is much more resistant, requiring 300 mg per kilogram for a fatal result. Weiss, Robb and Blumgart⁷ used the facial flush (capillary dilatation) that follows the intravenous injection of histamine into man as a measure of the velocity of blood flow, and found that the safe intravenous dose for man was not larger than 0.001 mg per kilogram of body weight, or an average total dose of 0.07 mg. Actually the authors gave 0.35 cc of a 1/5000 dilution of ergamine acid phosphate. Pertinent here was their observation that all patients with emphysema, bronchitis and asthma showed temporarily increased dyspnea with the symptom, asthma, after the administration of histamine. The patients were susceptible to the drug. Furthermore, it is known that normal persons and also asthmatic patients regularly show an immediate local reaction when a drop of 1/10,000 dilution (about 0.02 mg) of histamine is applied to a scratch in the skin.

Histamine is stable. The method of assay, as modified by Code,⁸ begins with the removal of protein substances by boiling in the presence of

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acetic acid, the histamine remains intact in the filtrate. In this regard, histamine behaves very differently from acetylcholine.

A second constituent of normal tissues is acetylcholine. A review of this substance, including its relation to other tissue derivatives, is included in the recent book by Cannon and Rosenblueth,⁹ *Autonomic Neuroeffector Systems*. In 1906, Hunt and Taveau¹⁰ published a paper "On the Physiological Action of Certain Choline Derivatives and New Methods for Detecting Choline." They pointed out that the acetic ester of choline was extremely active as a vasodilator and depressor substance. Later, Dale¹¹ found that aside from histamine, ergot contained another very active substance, the injection of which could slow the heart rate, cause marked vasodilation and stimulate contractions of the gastrointestinal tract, the substance resembled acetylcholine. In 1921, Loewi¹² isolated the hearts of two frogs and filled them with Ringer's solution. The vagus of one was stimulated for a few minutes. The fluid in that heart was then transferred to the second heart, which thereupon reacted as if its own vagus had been stimulated. The first vagus stimulation had given rise to a chemical substance that Loewi thereupon called *Vagusstoff*. After this, other investigators found that stimulation of the parasympathetic nerves running to many different organs—the chorda tympani nerve to the salivary gland, for example—caused the appearance of a similar substance in the blood, and that this could be carried to other organs, to mimic in them the effects of parasympathetic nerve impulses. The *Vagusstoff* was identified later as acetylcholine.

Acetylcholine has two pharmacologic characteristics that distinguish it from histamine. The base choline is stable, but it is not very active physiologically. Its esters, on the other hand, are labile but they are many hundred times as active as the base choline, and it is acetylcholine which has been identified in the body cells under certain conditions and which has been studied so extensively. However, when acetylcholine is introduced artificially into the body it is destroyed almost at once on contact with animal blood or tissue. This destruction depends on an enzyme—cholinesterase—which is present in normal tissues and which acts by hydrolyzing the ester into its two original components. Loewi¹³ and others showed that this enzyme could be inactivated by heat as are other enzymes. More important, the action of the enzyme is inhibited by the drug, eserine (physostigmine), as Loewi and Navratil¹⁴ were able to demonstrate, and this protection of acetylcholine has played an important role in many

studies. The action of eserine consists in preventing the union between acetylcholine and cholinesterase. Animals and tissues that are under the influence of eserine allow the full effect of acetylcholine to be exhibited and analyzed.

The second characteristic of acetylcholine is that its action is promptly and effectively prevented by atropine. Atropine appears to stop the access of acetylcholine to the cells of smooth and cardiac muscle and of glands. In spite of the fact that acetylcholine has a normal physiological function, it may (like histamine) become a poison when injected into man and animals. In the form of a stable synthetic compound—acetyl beta methylcholine—it has been used in the treatment of man and animals with profound effects. It causes contraction of striated muscles, it slows the heart and it lowers the blood pressure by causing a dilatation of peripheral arterioles, it causes sweating, flushing and rhinorrhea, finally, it may induce bronchospasm. All these effects are quite comparable with those following the injection of histamine. Each of the substances can induce asthma in susceptible persons. The one great difference is, however, that the effects of acetyl beta methylcholine can be blocked promptly by the administration of atropine, just as they can be enhanced by treatment with physostigmine, yet neither physostigmine nor atropine has any effect on the action of histamine. The importance of this relation is shown by the following report. Kokas, Sarkady and Went¹⁵ sensitized dogs to foreign protein and then before the second shocking dose was given they treated the animals with full doses of atropine. The fact that anaphylactic shock resulted as usual from the second dose and that atropine had not blocked the reaction was, to the authors, a demonstration that the anaphylactic poison was histamine and not acetylcholine.

These previous findings are summarized here for two reasons. First, there is today among students of the allergic diseases an increasing interest in histamine, even though as yet its role cannot be demonstrated with any assurance. Second, acetylcholine, like histamine, is found as a constituent of normal tissues, from which it is released by simple mechanisms, and it has effects that are much like those of histamine. It seems quite proper to examine the possibility that this other chemical neuroeffector—acetylcholine—may be playing a significant part in these peculiar clinical conditions.

The synthetic compound acetyl beta methylcholine (Mechoyl) is stable and has been used in many experiments both on man and on animals. Villaret and his co-workers¹⁶ found that a dose of

20 to 40 mg injected subcutaneously was enough to produce an attack of asthma in each of fifteen asthmatic patients and quite regardless of the type of asthma from which the individual patient suffered. Starr, Elsom, Reisinger and Richards¹⁷ and their associates have studied the clinical effects of acetyl beta methylcholine on many patients with various conditions including, especially, paroxysmal tachycardia (to use the parasympathetic effect on the pulse rate) and Buerger's disease (to use the peripheral vasodilator effect). Included in their study is the observation of a young man with a previous history of asthma who developed a typical asthmatic attack immediately following the administration of the drug. The attack lasted for about three minutes and then subsided spontaneously. The dose is not stated.

Fraser¹⁸ has studied the clinical effects of acetyl beta methylcholine extensively. Among other experiments, he watched under the fluoroscope the introduction of Lipiodol into the trachea and bronchi of a woman who had just been given a dose of 25 mg of Mecholyl intramuscularly. A definite constriction of the smaller bronchi was observed.

Myerson¹⁹ and his associates have also worked with the same drug but so far their subjects have not included patients with asthma.

Parrot²⁰ gave a milligram of eserine salicylate to a group of fasting individuals, drew samples of blood and then tested them on eserinated leech muscle. Using the blood of normal persons, no contraction occurred,—no acetylcholine could be demonstrated,—but in the blood of asthmatics, acetylcholine was found in seven out of the eight samples studied.

An analogous experiment but performed on rabbits is reported by Wenner and Buhrmester²¹. These authors sensitized rabbits to egg white and bled them during the shock resulting from a later dose. The acetylcholine content of the extracted blood was tested by intravenous injection into atropinized cats, so as to exclude the effect of histamine, and was then applied to a strip of eserinated muscle from the back of a leech. It was found that the amount of acetylcholine in the blood of the shocked animals was equivalent to a 1:1,000,000 or 1:10,000,000 dilution of acetylcholine chloride, whereas the blood of other sensitized but unshocked animals was equivalent to about half that strength, and the blood of normal nonsensitized animals contained no measurable amount. This result is especially interesting because the original sensitized rabbits were not treated with eserine before the shock and so one can assume that if acetylcholine was produced by the shock,

the amount destroyed before the blood was drawn was larger than the amount estimated by the test.

Milhorat²² made a different approach to the problem. He studied the cholinesterase activity of the blood in 109 patients with various diseases. He added the serum to known quantities of acetylcholine, and considered the amount of acetic acid set free by the enzyme as representing the amount of acetylcholine in the specimen. Five patients with asthma were included but the results, as in the other cases, varied widely and no conclusions could be drawn.

So far there is no other report of studies on the blood content of acetylcholine in patients with asthma. The problem is difficult, partly because the quantities to be expected are infinitesimal, and more important, because this substance in contrast to histamine is very delicate and labile. Obviously, however, further studies must be made because theoretically, as Alexander²³ said in his discussion of Wenner and Buhrmester's paper, histamine does not quite fill the bill but acetylcholine does,—and I add,—except for the one fact that its effect on the cells is easily blocked by atropine.

On histamine, recent studies include the following. If histamine is responsible for such a condition as status asthmaticus, an increase of histamine in the circulating blood might be anticipated. Riesser²⁴ tried to find it, but could demonstrate no more histamine in the blood of asthmatic patients than in that of tuberculous patients. Randolph²⁵ studied the blood of several patients with severe asthma, in 2 cases within a few hours of death from the disease, but the values obtained were within the limits of those found for the blood of normal persons and for the blood of other asthmatic patients between attacks. Fiessinger, Gajdos and Panayotopoulos²⁶ studied the blood histamine in various diseases. Using the color reaction of Pauly, which is even less accurate than the biological test, they showed slightly more histamine in the blood of patients with urticaria and asthma than in that of those with cirrhosis of the liver. Code and Hester²⁷ examined the blood of 2 horses and 6 calves during anaphylactic shock and found the quantity of histamine low rather than high. In a similar experiment on dogs, Dragstedt and Mead²⁸ found that the histamine in lymph and blood varies directly with the degree of shock, and disappears as the shock subsides. Such studies are difficult because the method of determining histamine, originally devised by Barsoum and Gaddum²⁹ and modified by Code,³⁰ consists in comparing the response of an intestinal strip from a guinea pig to the unknown solution with its response to a histamine solution of standard strength, and because the values obtained are less

than 1 gamma (a thousandth of a milligram) Code has shown that 90 per cent of the blood histamine is in the white cells and particularly in the eosinophilic leukocytes. Katz³¹ observed that the leukocytes can release histamine. He immunized rabbits to egg white and added small amounts of this substance to their blood in vitro, incubating the mixture for ten minutes. When the sensitized blood had undergone shock,³² its content in histamine was from one to six times as high as in the control blood drawn and incubated without the addition of egg white.

Meantime, Rose and Browne³² have sought to find why it is that the rat is many times as resistant to histamine as is the guinea pig (I should like to think of patients with asthma as behaving toward histamine like guinea pigs, while normal persons behave like rats). Rose and Browne injected a generous dose intravenously into a series of rats, and killed the animals at intervals in order to study their organs. They found that the injected histamine collected rapidly (within fifteen minutes) in the kidneys, from which it was redistributed slowly to the other tissues. If adrenal ectomized animals were used, the rate of redistribution was much slower in accord with the general decrease in resistance of the animal. Perl³³ observed that if sterile saline solution is injected intraperitoneally into rats, or if they are fed salt for several days before the dose of histamine, their resistance to the latter is increased. One would like to correlate this finding with the favorable effect that often follows the intravenous injection of normal salt solution into patients with asthma.

There have been one or two attempts to apply the histamine theory of allergy to practical use. In 1935, Dzsinich³⁴ treated a group of asthmatic patients with injections of histamine every other day, hoping to change their allergic susceptibility (*Bereitschaft*), and claimed that 12 out of 15 patients obtained complete relief. The duration of relief and the types of cases treated are not described. I have tried the method on a few patients with asthma, but with no striking results. Incidentally it was impossible for me to increase the subcutaneous doses above the certain small quantity that produced each time a mild flushing of the skin and a definite increase of the wheeze. The tolerance for histamine could not be increased at least by this method. Farmer³⁵ has recently tested the theory of desensitization by histamine by treating animals. Guinea pigs were sensitized to horse serum and then treated with histamine injected intraperitoneally at intervals of one to three days for a period of twelve to eighteen days. Later the uterine strips were suspended in the Dale bath and tested with increasing doses of horse

serum. Farmer found that the strip from the histamine-treated animals—both sensitized and normal—required larger concentrations of horse serum to produce contraction than did the strips from the animals not treated with histamine. In another paper, Farmer³⁶ reports that the feeding of histamine by mouth could also diminish the reaction of the sensitized uterine strip.

Histaminase has a current vogue. In 1930, Best and McHenry³⁷ tried to discover why the effects of histamine, whether injected intravenously or subcutaneously, were so transient. From normal dogs, they took 20-gm samples of various tissues and suspended each in 100 cc. of salt solution, adjusting the mixture to pH 7. Two samples of each kind of tissue were studied. Forty milligrams of histamine was added to one sample without other treatment, and to the other after boiling. The pairs were incubated at 37°C. for seventy-two hours, after which histamine determinations showed 36 mg still present in the heated material, but only 0.3 mg in the unheated. This experiment demonstrated that 20 gm. of moist tissue—in this case, kidney—could destroy almost 40 mg of histamine. Later a stable powder containing the histaminase was made by extracting fresh tissue with acetone and ether and rapidly drying the residue before a fan. They found that under favorable conditions, 200 mg of powder will inactivate 2 mg of histamine in twenty-four hours. However, the activity varies for different organs, the kidney and the intestine showing activities many times as great as those of other organs. Clinical interest in histaminase has been aroused by the report of Foshay and Hagebusch³⁸ that histaminase given by mouth in the form of tablets each containing 5 "histamine-detoxifying" units (three to fifteen tablets a day) or intramuscularly in ampules each containing 1 unit (up to four ampules a day) relieves serum disease.

Laymon and Cumming³⁹ treated 17 cases of urticaria with the tablets and claimed a cure in 10. In atopic dermatitis, however, no beneficial results were obtained in 8 cases. To interpret such findings is difficult. The clinical conditions are always extremely variable, and hard to control.

Experimenting on guinea pigs, Karady and Browne⁴⁰ used the ampules containing histaminase, injecting the contents intravenously fifteen minutes before an otherwise fatal intra abdominal dose of histamine. The animals survived. Furthermore, similar treatment protected them against anaphylactic shock. That these results did not depend on some nonspecific effect of the alarm reaction in guinea pigs, as described by the same authors,⁴¹ is attested by the fact that when the histaminase was inactivated at 56°C. for an hour

before being injected all its protective power was lost. As the authors comment, the time element in these experiments is important. In the test tube, destruction of histamine by the ferment requires between forty-eight and seventy-two hours, as Best and McHenry³⁷ showed. In the living animal, however, protection occurs in a few minutes. In my laboratory, the fresh organs of rats and of guinea pigs have been ground finely and let stand for periods of several minutes to several hours in salt solution containing various small concentrations of histamine, but so far no evidence of neutralization has been obtained when the mixtures are tested on the human skin and the reaction is compared with that of control solutions.

The discrepancy between the experiments made in the test tube and those made in the living animal is hard to explain. Still other observations are hard to fit into the picture as a whole. By the proper use of a galvanic current Abramson and Ochs⁴² were able to drive histamine into the intact skin so that an immediate wheal resulted by electrophoresis. Then Abramson and Engel⁴³ found that by reversing the polarity the histamine could be drawn out and identified by reintroduction into a new area of skin. Later the method was applied to skin tests with ragweed pollen in sensitive patients. By electrophoresis typical allergic wheals could be produced, but no histamine could be drawn out when the poles were changed. In preliminary experiments, Sulzberger⁴⁴ has mixed the enzyme histaminase with histamine and with various allergens, testing the mixtures on the skin of his sensitive patients, but so far he has been unable to demonstrate any neutralization—in the test tube.

DISCUSSION

There is evidence that histamine and acetylcholine may each be concerned with clinical allergy. So far, however, this evidence consists chiefly in the striking effects that occur when these substances are injected into animals and man. Each substance is quite capable of producing a clinical picture comparable to what is recognized as asthma, and further, each can be identified as a constituent of normal tissue. It is not surprising that there has developed a theory that one or the other is the end product resulting from the activity of a wide variety of exciting causes.

The method by which these two intracellular substances are released is interesting. Histamine appears after mechanical or toxic injury to the surface of the cell. Acetylcholine results from stimulation of the cell by nerves. The pathologic picture of asthma depends on the overactivity

of the bronchial glands which pour out the mucoid secretion which gives rise to the intrabronchial plugs of tough rubbery consistence so common in asthma. If this were a nervous effect would one not expect other evidence of cholinergic activity in the body as a whole? Slow pulse, low blood pressure, diarrhea, colitis and perhaps peptic ulcer are not common in asthma, and the evidence of cholinergic activity is slight. The theory of direct injury to the bronchial wall by the allergic reaction resulting from the inhalation of the specific dust substance is more tenable, but one must also explain the development of asthma after the ingestion of specific foods or the subcutaneous injection of foreign substances which can reach the bronchi only through the blood stream. This, however, is possible and on the whole the theory of the release of histamine by injury is more acceptable than the release of acetylcholine by nerve stimulation. Moreover, the lack of relief of asthma by atropine helps to exclude acetylcholine.

Whether one must assume that the patient with asthma behaves toward either acetylcholine or histamine in a manner different from the normal person is a proper question. That the substances increase in the blood during anaphylactic shock or during an attack of asthma is suggested by some experiments but not by all. A more probable explanation is that the patient with asthma reacts to similar quantities in a manner different from the normal person, and it is possible that an approach to this theory will be found later. The suggestion that histaminase may be effective in the treatment of asthma and allied conditions requires much more study, and one must not overlook the apparent vast difference in the time factor between neutralization *in vitro* and *in vivo*. In treatment, histaminase needs much wider trial before one can say that it is of value. Serum disease, hives, asthma and hay fever are prone to occur in attacks which may come and go suddenly. The cause of the attack as well as the cause of the recovery from it may, in a given case, depend on any one of a number of possible factors. The situation is always complicated, and observations in these diseases are always hard to control. New observations must be made, but their results must be interpreted with the greatest caution.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26161

PRESENTATION OF CASE

A twenty-five-year-old unemployed single man entered the hospital complaining of "soreness" in both sides of the abdomen for the previous five days.

Ten years before admission he was told at another hospital that his spleen was enlarged and he was advised to have it removed. His father would not consent to this. He had visited the Out Patient Department of this hospital for some incidental complaint that he did not remember. Since that time he had noticed pigmented spots on his legs, which he attributed to mosquito bites. Five years before admission the family noticed that his abdomen was becoming progressively larger. At the same time the patient noticed that the gums bled easily when he brushed his teeth or when he had teeth extracted. The tendency had improved in recent years. About a year before admission the color of the skin became darker, especially over the face. Five months before admission the right ankle became swollen and tender, without preceding trauma. X-ray films were negative. The ankle remained swollen and tender for about a month. Two and a half months before admission he had worked on a PWA project for two weeks, clearing brush, but this had to be discontinued because the ankle bothered him. He again went to the local hospital, and four more x-ray films were taken, which were negative. Since then he had remained in his room and had done no further work. The ankle improved in about two weeks. Three and a half weeks before admission he again visited the hospital because of recurrence of swelling in the right ankle. He stayed there a week and was told that his teeth were bad. Two and a half weeks before admission he had a premolar tooth extracted. Following this the gum bled for two days. Three days following the extraction, nodes in the right side of the neck became swollen and his throat became sore. The throat improved in the course of a week or ten days. Four days before admission he noticed that he was becoming short of breath. He had vomited occasionally for several weeks, this became almost a daily occurrence. The abdomen had been a little sensitive for some months on the left side, but a few days before

entry had been exquisitely tender on both sides.

His mother had been born in Nova Scotia, and his father in Massachusetts. They and six siblings were living and well.

The patient had been born in Massachusetts and had always lived there. He had had mumps, whooping cough and chicken pox as a child. Sixteen years before admission he had fallen from a tree and was unconscious for two or three hours but suffered no aftereffects. The tonsils and adenoids had been removed sixteen years before admission, he had bled quite a bit following the operation.

Physical examination showed a thin, fairly well developed, acutely ill man, with a copper-colored face. The voice was moderately high pitched and childish. The skin was dry and loose, and there were brown-black, slightly depressed areas of pigmentation over the anterior surfaces of the lower extremities below the knees. The teeth were partly missing, and those remaining showed caries and pyorrhea. There were small wedge shaped fatty deposits in the sclera of each eye on both sides of the cornea. He had a thin beard over the chin but no hair elsewhere on his face. The hair on the head and in the axillary and pubic regions seemed normal. There was slight generalized adenopathy, but no nodes measured over 1 cm in diameter. There was flatness and absent sound below the third rib on the left and the fourth on the right anteriorly. Posteriorly there was flatness below the angles of the scapulas on both sides. The abdomen was very tensely held and was quite tender, especially over the left half. By percussion and palpation a mass occupying the left two thirds of the abdomen could be rather indefinitely outlined. On rectal examination a large smooth mass was felt outside the bowel rather high up. The blood pressure was 120 systolic, 70 diastolic.

The temperature was 102°F, the pulse 110, and the respirations 25.

The urine showed the slightest possible trace to a large trace of albumin on several examinations, with occasional white blood cells and occasional hyaline and rare granular casts. The stools were negative for gross and occult blood and did not show fat on staining with sudan III, before and after acidifying and heating with acetic acid. The red-cell count was 3,600,000 at entrance and gradually fell to 2,500,000. The hemoglobin was 55 per cent (Tallqvist) at entrance and fell to 45. There were from 70 to 95 per cent polymorphonuclears on many occasions, and the white cell count varied from 22,000 at entrance to 36,000. An occasional myelocyte was seen in the smears. The red blood cells showed some variation in size.

and shape and slight achromia. Platelets were normal in number at entrance but became somewhat diminished several weeks later. The oxygen capacity of the blood was 772 vol. per cent, the color index 0.80, and the volume index 0.86. There was no significant difference in the white-cell and differential counts before and twenty minutes after the administration of 0.5 cc. of adrenalin subcutaneously. The Hinton test was negative. The icteric index was 6, and the van den Bergh normal. The liver function showed 0 to 5 per cent retention in thirty minutes by the bromsulfalein test. The nonprotein nitrogen was 23 mg per 100 cc. The phenolsulfonephthalein test of renal function showed 30 per cent excretion of dye in thirty minutes. The blood cholesterol was 42 and 61 mg per 100 cc. at two determinations. The bleeding time was four minutes, and the clotting time twelve minutes, as determined in an 8-mm test tube. The Congo red test for amyloid disease was negative. The fasting blood sugar was 91 mg per 100 cc., the serum calcium 8.31 mg., the phosphorus 4.10 mg., and the serum protein 6.1 gm. No Bence Jones protein was found in the urine. The total fatty acids of the blood were 280 mg per 100 cc., an essentially normal figure.

An x-ray film of the chest was negative except for the presence of an exceedingly high diaphragm—at the level of the third ribs anteriorly and the level of the angles of the scapulas posteriorly. The bones of the skull, arms, pelvis and femur showed no definite variation from normal when examined three days after entrance. The plates of the right ankle were reported as negative. A flat abdominal plate showed generally increased density with obliteration of the normal soft tissue shadows. An intravenous pyelogram showed that the left kidney was about twice the size of the right, but this was interpreted as being due to a congenital anomaly. There was no evidence of tumor. The epiphyseal lines along both iliac crests were open. A barium enema showed a low splenic flexure but no other definite abnormality.

During his stay in the hospital he continued to run an irregularly febrile course, the temperature varying from 98 to 103°F. His weight was 102 pounds at entrance, but this gradually fell to 94 in the course of several weeks. He remained quite ill and was always tender in the left upper quadrant, although this varied in degree from day to day. He vomited about once every two days, often in the morning after breakfast. A bone marrow biopsy from the left tibia showed several focal areas of very active marrow with all the normal elements present, red blood-cell formation was very active. About one month after entry

he was given a short course of x-ray treatment (600 r, divided into three treatments of 200 r each) over the spleen, this was followed by some improvement, the size of the abdomen definitely decreasing.

During the latter part of his stay he had transient ankle edema, lasting a few days and then clearing spontaneously. He vomited more frequently during the last few weeks in the hospital. During that time it was noted on several occasions that the abdomen was quite tympanitic high in the left upper quadrant, a condition not present on admission. Five days before death, under local anesthesia, a small abdominal incision was made. Dense adhesions between the peritoneum and an underlying mass were found, and there was considerable bleeding encountered on separating these. A small V-shaped section of the underlying mass was removed, and the wound closed without drainage. Following this he continued to fail and died two and a half months after entry.

DIFFERENTIAL DIAGNOSIS

DR. SIEGFRIED J. THANNHAUSER* I should like to give the following summary of the symptoms of this twenty-five year-old man. He had been in another hospital ten years previously and since then had been continually ill and under treatment for numerous complaints of indefinite origin. Moreover, it must be believed that he was really a sick person during this period, because his physical development was not up to par and his secondary sex characteristics did not develop fully—his voice was high pitched and childish, a thin beard covered his chin, but there was no hair on any other part of his face. This kind of infantilism and sexual retardation usually indicates the gradual progression of a severe disease which, like an enemy from within, retards development.

An enlarged spleen had been observed ten years before when the patient was in the other hospital. I think there is no reason to doubt this statement, even though there is no definite mention of an enlarged spleen in the physical findings reported during the period of hospitalization here. However, the report did state that his abdomen was very tensely held and quite tender over the left half. The patient himself reported that for some months before his admission to the hospital, his abdomen had been sensitive on the left side and, later on both sides. He vomited almost every day for a few weeks. A mass occupying the left two thirds of the abdomen could be rather definitely outlined by percussion and palpation.

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This mass was also felt by rectal examination, it was outside the bowel and rather high up. The flat abdominal x-ray plate showed a generally increased density, with obliteration of the normal soft-tissue shadows. There is no statement of an enlarged spleen. However, it is stated one month after entrance that the patient was given a short course of x-ray treatments over the spleen and that the size of the abdomen definitely decreased. But it must be re-emphasized that the history contains no exact statement about the spleen. I should nevertheless like to depend on the observation made ten years ago. Yet, something else must have developed in the patient's abdomen in addition to the enlarged spleen, because five years before admission the family had noticed that his abdomen was becoming progressively larger. The enormous mass noted in the physical findings was indefinitely outlined. The spleen alone, on the other hand, would always have very definite outlines. The smooth mass felt by rectum was certainly not the spleen, because, if so, it would not have been smooth. The intravenous pyelogram was evidently carried out to discover what other organs were involved in the large mass. It was found that the left kidney was about twice the size of the right, but this was interpreted as being of congenital origin. There was no evidence of a renal tumor. The barium enema also did not reveal a tumor, but only a low splenic flexure. In summary, I should like to say that all the search revealed nothing more than did the palpation, that is, the presence of an enormous mass with indefinite outlines. There is no statement of whether the mass moved with respiration. I should nevertheless like to assume that the mass did not belong to the kidney or to the intestines, but rather to the spleen and additional conglomerates probably present in the mesentery.

At the time when his spleen was pronounced enlarged at the first hospital, the patient also noticed pigmented spots, which persisted after their appearance. He attributed these to mosquito bites. Following up this symptom of pigmentation through the course of the disease, we find that about a year before the patient's admission here the color of the skin had become darker, especially over the face. During hospitalization, brownish-black slightly depressed areas of pigmentation were observed over the anterior surfaces of the lower legs. Small wedge-shaped, fatty deposits were noticed in the scleras of both eyes. Later, the copper-like color of the face was mentioned. The skin itself was dry and loose. In summarizing these symptoms, we have to ac-

cept the presence of a definite pigmentation, which had been increasing since the beginning of the disease.

Third, the patient had noticed before his admission to the hospital a tendency toward bleeding. This had first been observed after a tonsillectomy, and later after brushing his teeth. It was again noticed after the extraction of a tooth. With the extraction of another tooth, the gum bled for two days. Physical examination on entry revealed that his gums were in poor condition, but no bleeding spots were found.

The patient also reported that once after a tooth extraction he had swollen nodes in the neck, especially on the right side. That he had at the beginning of his hospital admission generalized adenopathy is a very important statement. It was mentioned, however, that no node was over 1 cm. in diameter. There is no subsequent mention of the adenopathy, but I believe it did not disappear, for otherwise reference would have been made to it.

The fifth feature that the patient himself had observed before admission to the hospital was swelling of the right ankle. The severe pain caused him to seek medical advice at different times, however, there were never any positive clinical or x-ray findings.

The patient's heart was normal. There were flatness and absent sounds below the third rib on the left and the fourth rib on the right anteriorly. There was flatness below the angles of the scapulas on both sides posteriorly. However, the x-ray film of the chest was negative, except for the presence of an exceedingly high diaphragm. There was no exudate, infiltrate or mediastinal shadow.

The patient did not mention that he had a fever before admission to the hospital. While at the hospital he had an irregularly febrile course, the temperature varying from 98 to 103°F. The pulse was about 110, and the respirations 25. He was very ill, and his weight fell from 102 to 94 pounds. The patient repeatedly vomited, very often in the morning.

Comparing the laboratory findings with the physical data, we note that the red-blood-cell count was 3,600,000, this gradually fell to 2,500,000. The hemoglobin dropped from 55 to 45. The white blood-cell count varied from 22,000 to 3600. The polymorphonuclears were always 95 to 97 per cent, occasionally a myelocyte was seen.

Bone-marrow biopsy revealed an active marrow with normal elements. Despite the bleeding tendency, there was no infiltration of bone marrow with a tissue that did not physiologically belong there. X-ray study of all the bones did not reveal

any abnormality in shape or structure. There was also no sign of leukemia in the bone marrow.

Chemical examination of the blood revealed two things of importance: no bilirubin, and low cholesterol and fat levels. The fact that he did not have any bilirubin excludes an increase in hemolysis or blood destruction. The low cholesterol and fat contents should be evaluated, in my opinion, as a sign of progressive disease leading to cachexia.

The liver function test with bromsulfalein was normal. The phenolsulfonephthalein test of the renal function showed 30 per cent excretion in thirty minutes. There was also an adrenalin test, but there is no report that after the test the spleen decreased in size. There was only a note that the white blood cells did not differ, before and after.

I should like to discuss four possibilities for diagnosis: splenic vein thrombosis, the so-called Banti syndrome, tumor of the adrenal gland or kidney, with invasion of the splenic vein and mesenteric metastasis, Gaucher's disease, and atypical abdominal Hodgkin's disease, with enlargement of the spleen and mesenteric lymph nodes, simulating a large tumor mass—probably reticulum-cell granuloma.

Splenic Vein Thrombosis When the patient was a youth, he had had an accident and later on developed a large spleen. While the platelets in thrombosis of the splenic vein are usually normal, the leukocytes are generally diminished in number. In this case there was leukocytosis, and only in the last few days a drop in leukocytes and platelets. The patient had never had ascites or signs of portal obstruction. The fever could be explained on the basis of the splenic vein thrombosis, and the enlargement of the kidney and the presence of large amounts of albumin by a renal vein thrombosis. However, neither the gradual development and presence of skin pigmentation nor the infantile physical appearance and retarded development are characteristic of splenic vein thrombosis. Furthermore, the outstanding feature in the later development of splenic vein thrombosis is ascites. No masses were felt in addition to the spleen.

Tumor of the Adrenal Gland or Kidney In favor of this diagnosis is the fact that an enlargement of the left kidney was noted. However, the x-ray examiner himself did not agree to the diagnosis of a tumor of the kidney. In considering a tumor of the adrenal glands, I do not know of any such tumor leading to a definite pigmentation. Neither medullary nor cortical tumors have pigmentation as a symptom. The masses felt by the rectal examination could be produced by the metastasis of such a tumor. However, the occur-

rence of all the other features, such as the bleeding tendency, pigmentation and, especially, the ten year duration of the disease, would be extremely rare in either renal or adrenal tumor. Even though nothing has been mentioned about the movement of the tumor with respiration, I should not like to believe that the kidney and spleen were confused in the examination made ten years before. Neither should I like to suggest that there was any confusion in the present examination.

Gaucher's Disease The following three features are favorable for a diagnosis of Gaucher's disease: a large spleen and general adenopathy, a bleeding tendency, and skin pigmentation on the leg and face. However, against such a diagnosis are the following findings: a normal bone marrow, normal shape of the bones, no structural deformity of the bones, the presence of granulomatous tissue in the abdomen, as evidenced by the adhesions between the peritoneum and underlying masses that were noted at the time of the abdominal incision.

Hodgkin's Disease After a discussion of these three possibilities, everything seems to draw our attention to a diagnosis of abdominal Hodgkin's disease. An initial symptom sometimes found in this disease is a tendency to bleed. An enlarged spleen is almost a constant finding. General adenopathy, which is present in Hodgkin's disease, was also observed in this case. Pigmentation of the skin and a dry skin are also found. I do not consider the pigmentation of the scleras of great importance. The intermittent fever in the last month of this case is also a feature of Hodgkin's disease. Leukocytosis in early stages but leukopenia and low platelets later are also observed. Objection may be taken to this diagnosis on the ground of the duration of the patient's illness, namely ten years. A duration of seventeen years has been observed, and I myself have a case under observation where the histological diagnosis was made ten years ago. The patient to whom I am referring is of about the same age as the one being discussed and shows exactly the same signs of infantilism. As a last indication of the granulomatous disease, I should like to call attention to the findings of the intra-abdominal biopsy, where adhesions between the peritoneum and underlying masses were found.

In conclusion, I should like to make a diagnosis of an atypical abdominal Hodgkin's disease of long duration, with pigmentation and, especially, involvement of the mesenteric nodes.

DR. FULLER ALBRIGHT There are two or three clinical features which did not come out strongly in the history. The triangular areas of fat deposit in the eyes were very striking. We thought that they were typical of Gaucher's disease, and located

fact furnishes a background for gall-bladder disease and allows a diagnosis of gallstone obstruction

Another possibility is a gradually progressing volvulus which slowly shuts off venous circulation of an intestinal loop, without producing the severe pain of a sudden, complete obstruction. Such a lesion does produce a transudation of fluid in the abdominal cavity, with tenderness, and may result in a concentrated blood indicated by an elevation of the red-cell count, it may also be accompanied by a leukocytosis. The situation calls for a decision as to whether one is going to operate as well as make a diagnosis, thus bringing up the question as to whether the patient ought to be treated conservatively by suction or a Miller-Abbott tube. I think the leukocytosis is an indication of existing or impending interference with the circulation of the small bowel and forces a decision to operate rather than to attempt deflation. I should put a slowly progressive volvulus of the small intestine as my first choice, but I should not be surprised if, in view of the urinary findings, something outside of the intestinal tract was found as a cause of the distention.

DR TRACY B MALLORY Dr Thompson, you saw this man in the Emergency Ward?

DR RICHARD H THOMPSON Yes. We believed that the findings were typical of acute small-bowel obstruction, and in view of the brief history and elevated white count, and the fact that the patient was in good condition, we decided to operate immediately. The first thing that I noted on exploring the abdomen, feeling in among dilated loops of small intestines, was a firm mass with a slightly rough surface which I thought might be a bolus of some kind in the bowel, but it soon became evident that it was a mass in the mesentery of the small intestine. There was no obstruction at the time the abdomen was opened, but there were two points in the jejunum which had undoubtedly been adherent to the mesenteric mass in such a way as to cause small-bowel obstruction by kinking. On the wall of the small intestine, which was supplied by the portion of mesentery in which the mass was found, were six or seven small firm nodules. Since I believed I was dealing with a tumor of the small intestine with metastases to the mesentery, the entire mass was resected. One or two nodules were noted distal to the resected mass. However, it seemed unwise to put the patient through a more extensive procedure, so an end-to-end closure was done and the abdomen closed.

CLINICAL DIAGNOSIS

Intestinal obstruction, acute

DR. MARKS'S DIAGNOSIS

Progressive volvulus of small intestine

ANATOMICAL DIAGNOSIS

Carcinoids, multiple, of the ileum, with regional metastasis

PATHOLOGICAL DISCUSSION

DR MALLORY The resected loop of ileum shows a number of disk-like plaques in the mucosa or submucosa varying from 3 to 6 mm in diameter. Some of them had extended through the muscularis to the serosa, but none actually reached the surface of the latter. There was no mucosal ulceration over any of them, and none of them were large enough to have produced any obstruction. The main tumor mass was, as Dr Thompson said, in the mesentery and represented a metastasis in a mesenteric node. It measured about 4 cm. in diameter. These findings are very characteristic and could hardly result from anything except so-called "carcinoid" tumor of the bowel.

Although carcinoids are rather uncommon tumors we have seen three within the last two months. The story is almost always the same, that of small-bowel obstruction due not to the primary tumor, which rarely reaches a diameter of over a centimeter, but to a mesenteric metastasis which results in adhesions or volvulus. It is also common to find multiple primary tumors, whereas the metastasis is apt to be single. Even with metastasis the prognosis is excellent, since, though local metastasis is common, generalized metastasis is extremely rare. We have one case, for instance, followed for twenty years after resection of a segment of ileum. At the operation metastatic nodes were noted deep in the mesentery. At the time of death from lobar pneumonia they were still present but the tumor had not extended any further throughout that period.

DR WYMAN RICHARDSON What is a carcinoid—an endothelial tumor?

DR MALLORY The pathognomonic feature from the histological point of view is that the tumor cells are argentaffin. That means that, if you stain them with a proper ammoniacal silver nitrate solution, black granules can be demonstrated in the cytoplasm. The adrenal medulla and various other tissues give this same staining reaction. Argentaffin cells are found normally throughout the intestinal mucosa from the stomach to the rectum. Tumors arising from them are uncommon, however, except in certain locations. The tumors occur most commonly in the appendix, where they rarely give rise even to local metastases. The next

commonest site is the ileum, where they are almost always invasive and frequently spread to the regional nodes. Cases with generalized metastases have been reported, but they are extremely rare.

DR. WALTER BAUER What does the lesion look like microscopically?

DR. MALLORY If you look at it with low power you might think of a basal-cell carcinoma of the skin. You see anastomosing cords of deeply basophilic cells, but the cells are quite small, not spindle shaped, and extremely uniform in size. Once in a while minute glandular spaces are formed, but glands are unusual. To the experienced eye the picture is unmistakable without any special staining technic. The architecture is that of carcinoma but the uniform, small cells and the absence of mitotic activity or nuclear atypicality rule out carcinoma.

DR. JOHN D. STEWART In light of the type of the lesion would you advise going back for the two nodules outside the field of operation?

DR. MALLORY I should not at his age. I am quite sure he will die of something else.

A PHYSICIAN Was the primary tumor single or multiple?

DR. MALLORY I think there were several, separate primary tumors, any one of which could have given rise to metastases, but have no way of knowing. They all look quite invasive but otherwise nonmalignant.

DR. ARTHUR W. ALLEN Did any of the nodules ulcerate the mucosa or were they all in the wall of the bowel?

DR. MALLORY They were all in the submucosa. Even when they invade the mucosa they never ulcerate.

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ANNUAL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY

THE scientific program for the annual meeting of the Massachusetts Medical Society has in past years been split up, for the most part, into meetings of the various sections. This method of presentation has had the disadvantage of not allowing for a co-ordination of broad topics as they relate to the general practitioner. To those responsible for the arrangements it seemed wise to present a unified and continuous program rather than a divided one, and this was so voted last autumn at a meeting of the section chairmen and secretaries and the Committee of Arrangements. That this should be a desirable change was predicted by the success of the combined clinical meetings that have been held during one day of the sessions for the past three years. It has the further advantage of allow-

ing members in all specialties, some of which are not represented by sections, to take part

In planning the program according to these ideas it has been possible to schedule what appears to be a sufficient amount of material in a two-day meeting. The annual dinner will take place on the evening of the first day, Tuesday, May 21, and will be followed by the Shattuck Lecture. The meeting will be finished late in the afternoon of the second day.

Tuesday morning will be devoted to a consideration of miscellaneous topics presented from the point of view of the surgeon, pathologist, obstetrician, internist, urologist and radiologist. On Tuesday afternoon there will be a symposium on respiratory-tract infections. This will include papers on the common cold, bronchiectasis, lung abscess and tuberculosis. Dr. Francis G. Blake, of New Haven, will present the latest views on the treatment of pneumonia. Wednesday morning is to be taken up by a symposium on syphilis, and in this, the Society is fortunate in having Dr. Thomas Parran, of the United States Public Health Service, as a participant. Wednesday afternoon will be devoted to a symposium on sulfanilamide and allied compounds, various aspects of the use of such drugs will be considered, with a summarizing discussion by Dr. Perrin H. Long, of Baltimore. There is to be discussion of most of the papers, but in each case this has been assigned. Owing to the number of papers to be presented, open discussion will not be possible.

Because the round-table discussions inaugurated last year by the Worcester committee were so successful, it has been decided to continue them, with modification. They are to be under the direction of the various sections and will be held at nearby hotels and the University Club from noon to 2:00 p.m. on the first day of the meeting. Five subjects will be taken up, and an opportunity will be given for informal discussion of each, to be led by an authority in each field. Each meeting will be preceded by a luncheon, and it will be necessary for the Committee of Arrangements to have a general idea of the number planning to attend. Therefore, the cards enclosed with the preliminary programs must be promptly returned.

In addition to the scientific program and the round-table discussions there will be a large number of scientific and commercial exhibits. The moving pictures were more popular last year than previously, presumably because a timetable of topics was published in advance, a similar schedule will be followed this year.

All in all the entire program is comprehensive and well co-ordinated and should offer wider opportunity than ever before for the members to learn and to discuss present trends and developments of medical knowledge.

GERIATRICS

THROUGHOUT the life cycle, the responses of the body to environmental and intrinsic factors are constantly changing. There are, however, two periods in particular during which the reactivity of tissues and organs differs considerably from what one may call the "average" responses. These are the years of infancy and childhood and those of old age. The behavior of the human organism during its early developmental period has been studied extensively, but the nature of the involuntary processes of old age has received relatively little scientific attention. Geriatrics as compared with pediatrics has been little cultivated.

The diseases and the behavior of the body in old age cannot be looked on as simple quantitative deviations from the norm. Just as many diseases of infancy and childhood are specific or essentially different from those of adults, so also are the diseases of the aged. Old age is characterized primarily by a reduced reserve of all organs and functions and by a generalized narrowing of the homeostatic adaptations. These changes alter the symptoms, signs and prognosis of diseases in this group, and in addition there are disorders specific to the old. Surgery in the aged also requires special consideration, and remarkable advances have been made recently in this branch of medicine. Finally, the altered response of senile persons to drugs and other therapeutic agents should be recognized by physicians.

Further progress in the care of the aged depends on extensive systematic investigation in the field

of geriatrics. Canstadt (1839), Geist (1860), Charcot (1868), Schwalbe (1909) and Schlesinger (1914) have emphasized the importance of diseases of old age, and it is of interest that a modern textbook describing such diseases is now available.* Contributions such as the one that appears in this issue of the *Journal* represent much needed information.

As the result of the recent progress in public health, preventive medicine and pharmacotherapy, it is expected that the average duration of life will be further prolonged. This increase in the number of the aged places added responsibility on physicians to secure more comfort and better medical and surgical care for them. There seems little doubt that geriatrics will become an important branch of medicine!

Müller Dehann, A.: *Die inneren Erkrankungen im Alter*. Wien: Julius Springer, 1937. 408 pp.

MEDICAL EPONYM

BRIGHT'S DISEASE

Richard Bright (1789-1858) lecturer on the practice of medicine and one of the physicians to Guy's Hospital, included in his *Reports of Medical Cases Selected with a View of Illustrating the Symptoms and Cure of Diseases by a Reference to Morbid Anatomy* (London: Longman, Rees, Orme, Brown and Green, 1827) the results of his investigations of the pathologic conditions associated with albuminous urine. Their epoch making character has served to attach his name permanently to the whole group of nonsurgical diseases of the kidney. The following quotation is taken from the introductory remarks of the author:

The different diseases of the heart and of the lungs on which dropsy depends, and the various changes to which the liver is subject rendering it a cause of impediment to the circulation are still open to much investigation.

There are other appearances to which I think too little attention has hitherto been paid. They are those evidences of organic change which occasionally present themselves in the structure of the KIDNEY and which, whether they are to be considered as the cause of the dropsical effusion or as the consequence of some other disease cannot be unimportant. Where those conditions of the kidney to which I allude have occurred I have often found the dropsy connected with the secretion of albuminous urine, more or less coagulable on the application of heat. I have in general found that the liver has not in these cases betrayed any considerable marks of disease either during life or on exami-

nation after death, though occasionally incipient disorganization of a peculiar kind has been traced in that organ. On the other hand, I have found that where the dropsy has depended on organic change in the liver, even in the most aggravated state of such change no diseased structure has generally been discovered in the kidneys, and the urine has not coagulated by heat. I have never yet examined the body of a patient dying with dropsy attended with coagulable urine in whom some obvious derangement was not discovered in the kidneys

R W B

OBITUARY

HERMAN FRANK VICKERY

1856-1940

The death of Dr Herman F Vickery must not pass without a tribute to the worth and importance of his life. For, although he retired many years ago, he played a prominent part in establishing the foundations upon which, in Boston, our present medical structure has developed.

He was born in Rochester, New York, in 1856. Graduating in 1878 from Harvard College and in 1882 from Harvard Medical School, he was a leader in scholarship and was highly regarded by his classmates for his earnestness and sincerity. He served with credit as a house pupil at the Massachusetts General Hospital, starting in 1882, and followed this with a year of study at the University of Leipzig and at the Vienna General Hospital. Returning to Boston in 1883 he entered on the practice of medicine, in which he continued until 1917, from 1884 onward he was identified with the work of the Massachusetts General Hospital and the clinical instruction at the Harvard Medical School.

The period of nearly four decades in which Dr Vickery served was one in which medicine underwent a process of extraordinary development. During his internship, surgeons still operated in frock coats, medical therapeutics depended principally on empirical pharmacology, and laboratory diagnosis included little more than urinalysis. At the time of his retirement, medical procedure had assumed a general pattern essentially similar to that of today. In the interval, among other advances too numerous to mention, there were introduced the clinical applications of bacteriology in tuberculosis, diphtheria, typhoid fever, syphilis and other diseases, which revolutionized diagnosis and prophylaxis and, in some, treatment. Abdominal surgery, gaining impetus from the recognition of appendicitis, accomplished the major part of its impressive development. The x-ray machine, the sphygmomanometer and the electrocardiograph

were invented, and technics developed. Clinical and experimental research added many new conceptions and led to the progressive evolution of the clinical laboratory. And it is to be remembered that, coincidentally with these advances, there were constantly appearing, in even greater volume, claims of discoveries which were not substantiated, so that it was only by a laborious process of proving the true and eliminating the false that sound progress was attained.

Throughout these decades, Dr Vickery served the hospital faithfully and efficiently, advancing through the years in the responsibility of his position and in the esteem of his colleagues. While he was somewhat overshadowed by his two outstanding seniors, Dr Reginald H Fitz and Dr Frederick C Shattuck, his careful and painstaking approach together with his knowledge of medicine and his insight into human nature caused him to be recognized as an exceptional clinician. Although the requirements of his large private practice precluded original research, he exercised a most wholesome influence through a highly developed critical ability that enabled him to evaluate the publications of others with unusual accuracy, thus escaping the pitfalls of current fallacies while confirming and utilizing real advances. Through his long period of service to the hospital he demonstrated by example the value of clear vision and sound conservative judgment, and it was by these qualities more than by precept that he earned the enduring gratitude and appreciation of the long succession of interns who served under him. He also set a noteworthy standard by the meticulous performance of all his duties. If, as is often said, the Massachusetts General Hospital is outstanding for the conscientious thoroughness of its routine work, there is probably no one who did more to justify this reputation than did Dr Vickery.

He was honored by election to the presidencies of the Boylston Medical Society, the Boston Society for Medical Improvement and the Suffolk District Medical Society, and to membership in the Association of American Physicians. He was associate editor of Sajous's *Annual and Cyclopedia of the Medical Sciences*, and to this he contributed articles, notably on rheumatic fever, chorea and rheumatic heart disease, containing original observations still credited with influencing our present conceptions. He published a translation of Strümpell's *Textbook of Medicine*. He was the first in this country to report cases of psittacosis. But, more than for his publications, he is to be remembered for the influence of his life of service in sustaining and consolidating medical progress.

F W P

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS
AND GYNECOLOGY*

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330 Dartmouth Street
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PUERPERAL SEPSIS FOLLOWING
NORMAL DELIVERY

Mrs. M., a thirty-eight year-old para IV, about thirty six weeks pregnant, entered the hospital on the afternoon of March 14, 1940, the membranes had ruptured twenty four hours previously, and she was having indefinite contractions.

The family history was negative. The patient's past history included the usual children's diseases and diphtheria. The tonsils had been removed and in 1929 a suspension and appendectomy had been performed. The three previous pregnancies and deliveries were uneventful, there was no history of miscarriage. Catamenia began at twelve and were regular, with a twenty-eight-day cycle. The last normal period was July 10, 1939, making the expected date of confinement April 17. The pregnancy had been normal and uneventful until the day of entry to the hospital.

Rectal examination at 7 p.m. showed the cervix to be three-fingers dilated and very soft. A normal delivery was effected at 7.30 p.m. The baby was a boy and seemed in good condition, he was not weighed. The placenta and membranes were delivered intact.

The following morning, twelve hours after delivery, the temperature was 99.6°F, and the pulse 110. Four hours later the temperature was normal, but in the afternoon, following a slight chill, the temperature rose to 103.2°F, with a pulse of 116. The temperature gradually fell during the night until it was again normal. At 9 a.m. the next day, March 16, following a slight chilly sensation, the temperature went to 102.0°F, and later in the day to 102.6. Physical examination showed a somewhat reddened throat and a slightly distended abdomen, the lochia was not remarkable. A consultation was immediately held with a surgical bacteriologist. Cultures were taken from the lochia, throat and blood stream, and all eventually showed hemolytic streptococci. Sulfapyridine was started even before the results of the cultures and smears had been reported. It was given in doses of 15 gr every hour for four doses and subsequently 15 gr every four hours. After the cultures had been reported, the drug was changed to sulfanilamide.

The dosage was 20 gr every four hours for twenty four hours, then 15 gr every four hours, and subsequently 10 gr every four hours, until it was finally omitted on March 22.

The temperature came down to normal on March 18 and so remained throughout the subsequent convalescence. She was discharged in good condition on March 31, the seventeenth day after delivery.

The following white counts are of interest: March 16, 18,900; March 20, 21,000; March 21, 27,400; March 22, 29,900; March 23, 29,900; March 25, 26,400; March 26, 17,800; March 27, 14,900; March 28, 16,700; March 29, 12,600; March 30, 10,000. The sustained increased white count following the drop of the temperature to normal was probably due to the sulfanilamide.

Comment. This case illustrates the proper handling of certain cases of puerperal sepsis. The temperature of 99.6°F twelve hours after delivery with a rise to 102.6 eight hours later, suggests that the infection was present at the time of delivery. The administration of sulfapyridine before the cultures were reported and the shift to sulfanilamide afterward show the use of intelligent chemotherapy based on knowledge of the true etiologic factor. The uterus was left entirely alone.

MEDICAL POSTGRADUATE
EXTENSION COURSES

The following sessions given by the Massachusetts Medical Society in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau have been arranged for the week beginning April 21:

BRISTOL SOUTH (Fall River Section)

Tuesday April 23 at 4.30 p.m. at the Union Hospital, Fall River. Syphilis in Pregnancy and the Offspring. Instructor Francis M. Thurmon. Howard P. Sawyer, *Chairman*.

HAMPSHIRE

Thursday April 25 at 4.00 p.m., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8.15 p.m. in the Outpatient Department of the Skinner Clinic, Holyoke Hospital, Holyoke. Complications in Obstetrics, illustrated by Case Histories. Instructor Roy J. Heffernan. George L. Schadt, *Chairman*.

HAMPSHIRE

Thursday April 25 at 4.15 p.m., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton. Syphilis in Pregnancy and the Offspring. Instructor Francis M. Thurmon. Warren P. Cordes, *Chairman*.

MIDDLESEX SOUTH

Tuesday April 23 at 4.30 p.m., at the Cambridge Hospital, 330 Mt. Auburn Street, Cambridge. Gonorrhea in the Female. Instructor Sylvester B. Kelley. Dudley Merrill, *Chairman*.

*A series of selected case histories by members of the section will be published, with comments and questions by subscribers are solicited and will be discussed by members of the section.

NORFOLK SOUTH

Monday, April 22, at 8 30 p.m., at the Quincy City Hospital, Quincy Cardiovascular Disease Eleven important questions about heart disease and their answers Instructor Burton E. Hamilton. David L. Belding, *Chairman*

PLYMOUTH

Tuesday, April 23, at 4 00 p.m., in the Nurses' Home of the Brockton Hospital, Brockton Head and Spine Injuries Instructor Donald Munro Walter H. Pulsifer, *Chairman*

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ool of Medicine, 1933
Hospital Northampton.

County Sanatorium Hay

ges of Physicians and Sur
i Glasgow, Scotland, 1937

as, *Secretary*

ST DISTRICT

ngton Street, Winchester
of Medicine, 1936.

nt Street, Woburn.
ol of Medicine, 1932.

ford Road Melrose
of Medicine, 1937

n Avenue, Wakefield.
s, 1932.

chlan, *Secretary*

ETH DISTRICT

ad, Westford.
of Medicine, 1902

ary State Hospital and In-

hool 1938.

Merrimack Street, Lowell
ool of Medicine, 1935

Street, East Pepperell.
hool, 1937

Goldsmith Street, Littleton

ool of Medicine, 1935

me, *Secretary*

TH DISTRICT

Memorial Drive, Cambridge.
School of Medicine, 1936.

141 Walcutt Street, Newton

y of Medicine, 1938

Street, Waltham.

ernität, Munich, 1927

Street, Cambridge.
1933.

CANTANELLO VINCENT J., 385 Broadway Everett.
Middlesex University School of Medicine, 1933

COLANTINO GEORGE J. 490 Highland Avenue, Malden.
Middlesex University School of Medicine, 1933.

CONROY JOHN A., 183 Tremont Street, Newton.
Kansas City University of Physicians and Surgeons,
1933.

DRISCOLL, DANIEL T., 511 Pleasant Street, Malden.
Massachusetts College of Osteopathy 1926.
Middlesex University School of Medicine, 1935

DUCHIN MAURICE S., 89 Magazine Street, Cambridge.
Chicago Medical School 1929

FINLEY KNOX H. 27 South Crescent Circle, Brighton.
Yale University School of Medicine, 1930

FISCHER JOSEPH 1942 Beacon Street Brighton.
University of Vienna 1915

FOSTER, FRANK P. 31 Magnolia Avenue, Newton.
McGill University Faculty of Medicine, 1933.

FRIEDMAN EMERICK Metropolitan State Hospital, Waltham.
University of Buffalo School of Medicine, 1934

GALL, EDWARD A., 77 Marno Street, Cambridge.
Tulane University of Louisiana School of Medicine,
1931

GRINOLD, JOHN J. 225 Belmont Street, Belmont.
Middlesex University School of Medicine, 1932.

HAINES, GEORGE A., 641 Broadway Everett.
Middlesex University School of Medicine, 1915

KEYORKIAN JOHN J., 104 Mt. Auburn Street, Watertown.
College of Physicians and Surgeons, Boston, 1934

MACKILLOP JOHN A., 381 Broadway Cambridge.
Tufts College Medical School 1938.

MORITZ, ALAN R., 19 Fenwick Road Waban.
University of Nebraska College of Medicine, 1923

NADEL, FREDERICK P., 55 Magazine Street, Cambridge.
Middlesex University School of Medicine, 1932.

OSGOOD RUDOLF 370 Common Street, Belmont.
Rush Medical College of the University of Chicago,
1932.

POLLAK, OTAKAR J. 124 Glenville Avenue, Allston.
Medical School of Masaryk University in Brno, 1930

RAK, IAN P. 1 Oakland Street, Lexington.
University of Leipzig, 1933

SELLMAN PRISCILLA, 38 Beecheroff Road Newton.
Boston University School of Medicine, 1936.

WATKINS, ARTHUR L., 68 Gray Street, Arlington.
Harvard Medical School 1935

Alexander A. Levi, *Secretary*

NORFOLK DISTRICT

ALEXANDER FRANCIS J., 118 Common Street, Walpole.
Middlesex University School of Medicine, 1933.

ALPERT GEORGE R., 50 Verndale Street, Brookline.
University of California Medical School 1936.

BALDWIN ARTHUR D., 619 Washington Street, Wellesley
Harvard Medical School, 1936.

BENDA CLEMENS E. Wrentham State School Wrentham.
University of Berlin 1922.

BEREZIN MARTIN A. Medfield State Hospital Harding
Boston University School of Medicine, 1937

BONNER, HUGH J., 476 Centre Street, Jamaica Plain.
McGill University Faculty of Medicine, 1937

CARMODY, ROBERT F, 1810 Beacon Street, Brookline.
Middlesex University School of Medicine, 1933

CHAFETZ, MAX, 116 Norfolk Street, Dorchester
Tufts College Medical School, 1931

CIVEN, EVA, 1077 Blue Hill Avenue, Dorchester
Middlesex University School of Medicine, 1925

COMANDURAS, PETER, 25 Blue Hill Avenue, Roxbury
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DOBELLE, MARTIN, 25 Littell Road, Brookline.
University of Ghent (Belgium) Faculty of Medicine, 1934

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Tufts College Medical School, 1938

TOUMAY, JAMES W JR., Wampatuck Road, Dedham
Columbia University, College of Physicians and Surgeons, 1926

WEXLER, JACOB, 967 Blue Hill Avenue, Dorchester
Middlesex University School of Medicine, 1933

WILLGOOSE, DORATHEA M, 10 Noyes Street, Needham.
Philadelphia College of Osteopathy, 1932.
Middlesex University School of Medicine, 1935

Frank S Cruickshank, *Secretary*

NORFOLK SOUTH DISTRICT

ELDER, BURTON F, Hingham.
Ohio State University College of Medicine, 1937

FRANKMAN, WILLIAM, 736 Hancock Street, Wollaston.
St. Louis College of Physicians and Surgeons, 1921

NOBILI, CONRAD, 14 Guild Street, Quincy
Royal University of Rome Faculty of Medicine and Surgery, 1934

PEARLSTEIN, MAX, 447 Washington Street, Braintree.
Tufts College Medical School, 1929

Robert L Cook, *Secretary*

PLYMOUTH DISTRICT

FRITZ, LEWIS E, 34 Park Street, Stoughton.
Tufts College Medical School, 1926

MATHEWS, MOLYNEAUX P, 28 Maple Avenue, Brockton.
Middlesex University School of Medicine, 1933

POLLEN, DAVID A, 24 School Street, Middleboro
Middlesex University School of Medicine, 1931

Howard C Reed, *Secretary*

SUFFOLK DISTRICT

ALTSCHULE, MARK D, 74 Fenway, Boston.
Harvard Medical School, 1933

CLARKE, SAMUEL T, 17 Pinckney Street, Boston.
Harvard Medical School, 1936

CRANDON, JOHN H, Boston City Hospital, Boston.
Harvard Medical School, 1937

DAVIS, BURNET M., 15 Phillips Street, Boston
Harvard Medical School, 1937

DONAGHY, GEORGE E., 270 Bay State Road, Boston.
Tufts College Medical School, 1934

FISHGAL, MAURICE C, 394 West Broadway, South Boston.
Middlesex University School of Medicine, 1934

GAHM, IRVIN G, Boston City Hospital, Boston.
Tufts College Medical School, 1939

GATES, DONALD C, Gray, Maine.
Harvard Medical School, 1933

GOLDMAN, MAX, Long Island Hospital, Boston.
Tufts College Medical School, 1936

GOULD, DAVID M., Boston City Hospital, Boston.
Harvard Medical School, 1929

HADLER, ARTHUR J, Long Island Hospital, Boston.
Harvard Medical School, 1935

HAWKINS, RALPH L., 146 Marlboro Street, Boston.
Harvard Medical School, 1933

HOXIE, THOMAS B, Boston City Hospital, Boston.
Tufts College Medical School, 1937

LEVER, WALTER F, 22 West Cedar Street, Boston
Universities of Heidelberg, Vienna, Zurich, Hamburg, Leipzig, 1934

- LEWIS, EMIL H., 107 Trenton Street, East Boston.
Boston University School of Medicine 1936
- MALCOLM, FREDERIC, 22 East Brookline Street, Boston.
Middlesex University School of Medicine, 1931
- MARTIN, FRANK W., 520 Commonwealth Avenue, Boston.
Harvard Medical School 1916
- MOLLIVER, HENRY, 258 Washington Avenue Chelsea.
Middlesex University School of Medicine, 1934
- NATHANSON, IRA T., 119 Peterboro Street, Boston.
Northwestern University Medical School 1930
- NEWTON, AARON W., Boston City Hospital, Boston.
Tufts College Medical School, 1937
- SIMPER, NELSON R., 616 Broadway South Boston.
Washington University School of Medicine 1936
- STRAHM, CARL, Long Island Hospital, Boston.
Tufts College Medical School, 1937
- THOMPSON, RICHARD H., 7 Exeter Street, Boston.
Harvard Medical School 1934
- TRIMAN, CLAUDE W., 86 Commonwealth Avenue, Boston.
State University of Iowa College of Medicine, 1934
- WARTHIN, THOMAS A., 112 Revere Street, Boston.
Harvard Medical School, 1934
- WISING, EUGEN G., 750 Harrison Avenue, Boston.
University of Berlin, 1926
- WRIGHT, MARIAN L., 14 Buswell Street, Boston.
Boston University School of Medicine, 1936
- ZIGLER, EDWIN E., United States Marine Hospital, Chelsea.
George Washington University Medical School 1928
- ZOLL, PAUL M., 25 Peterboro Street, Boston.
Harvard Medical School, 1936

Milton Henry Clifford, Secretary

WORCESTER DISTRICT

- ARNOLD, JAMES O., 2nd, 174 Park Avenue, Worcester
Temple University School of Medicine, 1932
- BROTH, ALFRED R., 159 Hamilltwo Street, Southbridge.
Boston University School of Medicine, 1938
- FULDER, HANK, 10 Cottage Street, Worcester
University of Lausanne, 1934
- GORDON, SYDNEY R., 208 Highland Street, Worcester
Tufts College Medical School, 1937
- HUCK, CHARLES B. JR., 8 Paul Revere Road, Worcester
Harvard Medical School 1936
- KANT, OTTO, 10 Bruce Avenue, Shrewsbury
Universities of Freiburg, Göttingen and Munich, 1923
- KAPLAN, S. HARVARD, Worcester State Hospital, Worcester
University of Wisconsin Medical School 1936
- KENDALL, ROBERT P., Worcester State Hospital, Worcester
Jefferson Medical College, 1933
- LAWRENCE, PETER A., 522 Grafton Street, Worcester
Middlesex University School of Medicine, 1933
- MALAMUD, WILLIAM, Worcester State Hospital, Worcester
McGill University Faculty of Medicine, 1921
- MILNER, ADOLPH, 4 Amherst Street, Worcester
Cornell University Medical College, 1934
- MITCHELL, FRANK, 753 Pleasant Street, Worcester
Friedrich-Wilhelms University Berlin, 1915
- ROBINSON, HARRY A., Fiskdale.
Kansas City University of Physicians and Surgeons,
1932
- ROZANSKI, FRANK S., 554 Cambridge Street, Worcester
Hahnemann Medical College and Hospital 1937

- RUSSELL, FRANK H., 78 Burncoat Street, Worcester
University of Tennessee College of Medicine, 1917
- SALOMON, ROBERT, 138 Elm Street, Worcester
Universities of Frankfurt, Heidelberg, Kiel, Freiburg,
1926
- SPIRA, BERTHA, Worcester State Hospital, Worcester
University of Illinois College of Medicine, 1935
- WALDMAN, JACOB E., 1131 Main Street, Leicester
Tufts College Medical School 1933

George C. Tully, Secretary

WORCESTER NORTH DISTRICT

- COLBY, FRED B., 46 Oliver Street, Fitchburg
University of Lausanne Medical School 1937
- FAUST, PAUL J., Gardner State Hospital, East Gardner
University of Colorado School of Medicine, 1929
- GROSSMAN, MYER J., 599 Main Street, Athol.
Middlesex University School of Medicine, 1933
- KILLELA, EDWARD V., 40 Pritchard Street, Fitchburg.
Baltimore Medical College, 1903
- SCHREIBMAN, HAROLD, 520 Main Street, Fitchburg
Middlesex University School of Medicine 1934
- TUCK, HERBERT A., Norcross Terrace, Fitchburg.
Tufts College Medical School, 1938

Edward A. Adams, Secretary

DEATHS

LORD—SIDNEY A. LORD, M.D., of Boston died March 30. He was in his seventy-second year.

Dr. Lord received his degree from the Harvard Medical School in 1894 and specialized in neurology. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

VAN GAASBEEK—GEORGE H. VAN GAASBEEK, M.D., of Springfield, died January 22. He was in his seventy-seventh year.

Dr. Van Gaasbeek received his degree from the Albany Medical College in 1893. He was a member of the Massachusetts Medical Society and the American Medical Association.

MISCELLANY

WHAT THE DOCTOR SHOULD KNOW

April is the month in which tuberculosis associations proclaim the importance of the early diagnosis of tuberculosis. Through various channels of publicity the public is urged to take heed of the early symptoms. They are told also about the advantage of the tuberculin test and the x-ray as means of discovering tuberculosis even before symptoms appear. Physicians play their part by meeting the demand for more prompt and precise diagnosis. Dr. Henry C. Sweeney of the Research Laboratories of the City of Chicago Municipal Tuberculous Sanatorium, who has contributed the following sees clinical tuberculosis through the eyes of the pathologist familiar with end results. An understanding of what lies beneath the often obscure signs of approaching tuberculosis should be valuable to the practitioner whose field of battle is mostly in the sick room.

CARMODY, ROBERT F, 1810 Beacon Street, Brookline.
Middlesex University School of Medicine, 1933

CHAFETZ, MAX, 116 Norfolk Street, Dorchester
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Middlesex University School of Medicine, 1935

Frank S Cruickshank, *Secretary*

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POLLEN, DAVID A, 24 School Street, Middleboro
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Howard C Reed, *Secretary*

SUFFOLK DISTRICT

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Harvard Medical School, 1933

CLARKE, SAMUEL T, 17 Pinckney Street, Boston
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CRANDON, JOHN H, Boston City Hospital, Boston.
Harvard Medical School, 1937

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Tufts College Medical School, 1939

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Harvard Medical School, 1933

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Harvard Medical School, 1935

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Harvard Medical School, 1933

HOXIE, THOMAS B, Boston City Hospital, Boston.
Tufts College Medical School, 1937

LEVER, WALTER F, 22 West Cedar Street, Boston.
Universities of Heidelberg, Vienna, Zurich, Hambur-
g, Leipzig, 1934

in the April 11 issue of the *Journal*. The revised program is as follows.

Presentation of cases.

Some Problems in the Proper Emptying of Hollow Viscera. Dr W J Merle Scott, of Rochester, New York.

JOINT MEETING OF THE SUFFOLK DISTRICT MEDICAL SOCIETY AND THE BOSTON MEDICAL LIBRARY

A joint meeting of the Suffolk District Medical Society and the Boston Medical Library will be held on Wednesday evening, April 24, at 8 15 at the Boston Medical Library, 8 Fenway, Boston.

PROGRAM

Official reports of the Society for 1938.

Election of officers.

Atom Smashing as a New Tool for Medical Research (with demonstration) Dr J J Livingood. Discussion will be opened by Drs. Shields Warren Francis T Hunter and Saul Hertz.

BOSTON DOCTORS' SYMPHONY ORCHESTRA

The first concert of the Boston Doctors' Symphony Orchestra, Alexander Thiede, conductor, will be held at 8 15 on Sunday evening, May 5 at Jordan Hall. Tickets are priced at one dollar and the proceeds will be given to a medical charity. The ticket committee is composed of Dr Welman B. Christe, chairman, 15 Bay State Road, Boston; Dr Julius Loman, 1284 Beacon Street, Brookline, and Dr Robert G Vance, 262 Beacon Street, Boston.

HENRY JACKSON LECTURE

The Henry Jackson Lecture for 1940 offered by the New England Heart Association will be given by Dr Harrison S. Marland, chief medical examiner of Essex County, New Jersey and professor of forensic medicine, New York University College of Medicine. His subject will be "Sudden Deaths with Reference to Their Prevention." The lecture will be held at the Boston Medical Library on Friday, April 26, at 8 15 p.m.

Interested physicians and medical students are invited to attend.

MASSACHUSETTS DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

PUBLIC WELFARE PHYSICIAN (MALE), DEPARTMENT OF PUBLIC WELFARE

Director of State Civil Service, Ulysses J. Lupien has announced that a competitive examination is to be held on May 11 in order to find eligibles for appointment to the position of Public Welfare Physician, Department of Public Welfare. The entrance salary is \$3780 a year; the maximum is \$4500 a year.

The entrance requirements are as follows: applicants must be registered physicians under the State Board of Registration in Medicine, and must have at least five years' experience in the practice of medicine, at least one year of which shall have been spent as an intern in a hospital approved for internship by the American Medical Association.

The substitution is as follows: satisfactory full-time experience in a medical administrative capacity in a hospital, public-health organization, department of public health or department of public welfare within the past five years may be substituted year for year for the years of experi-

ence required in the practice of medicine, except for the year of internship. The substitution of education is education may be substituted for experience, year for year of graduate study in a school of public health.

The subjects and weights of the examination are as follows: training and experience, 2, practical questions, 3 total, 5. Applicants must obtain a grade of 70 per cent in each subject in order to become eligible. The last date for filing applications is Saturday April 27.

NEW ENGLAND ROENTGEN RAY SOCIETY

The next meeting of the New England Roentgen Ray Society will be held in the main amphitheater of the Children's Hospital on Friday April 26, at 8:00 p.m.

PROGRAM

Cranioleptomycin. A report of 54 cases. Dr E. C. Vogt. Genitourinary Diagnosis and Treatment in Infants and Children. Persistent pyuria, kidney embryoma and retroperitoneal neuroblastoma. Drs. G. M. Wyatt and W. E. Ladd.

Tumors in Early Life. Dr. Sidney Farber.

Dinner at the Harvard Club will be served at 6:30 p.m.

SOCIETY MEETINGS AND CONFERENCES

CALNDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, APRIL 21

TUESDAY APRIL 23

9-10 a.m. Ovarian Tumors. Dr J. T. Smith. Joseph H. Pratt Diagnostic Hospital.

12:30 p.m. An Experiment in the Delivery of Medical Care. Dr. Chesley Frothingham. Community Nursing Council of Boston. Young Women's Christian Association, 140 Clarendon Street, Boston.

8:15 p.m. Harvard Medical Society. Amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance).

WEDNESDAY APRIL 24

9-10 a.m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

2-4 p.m. Hematuria. Drs. W. C. Quinby and E. A. Brand. Peter Bent Brigham Hospital.

8 p.m. Massachusetts Dental Society. Georgian Room, Hotel Statler.

8:15 p.m. Joint meeting of the Suffolk District Medical Society and the Boston Medical Library. 8 Fenway, Boston.

THURSDAY APRIL 25

9-10 a.m. Off the Main Road in Diabetes. Dr J. J. Schlem. Joseph H. Pratt Diagnostic Hospital.

FRIDAY APRIL 26

9-10 a.m. Small-Bowel Obstruction. Dr L. S. McIntirick. Joseph H. Pratt Diagnostic Hospital.

8 p.m. The Clinical Interpretation of Bacteremia. Dr. Chester S. Keeler. Sir William Osler Honorary Society of the Tufts College Medical School. Beth Israel Hospital. 1000 Comm.

8 p.m. New England Roentgen Ray Society. Children's Hospital main amphitheater.

8:15 p.m. Sudden Deaths with Reference to Their Prevention. Dr. Harrison S. Marland. Henry Jackson Lecture. Boston Medical Library. 8 Fenway.

SATURDAY APRIL 27

9-10 a.m. Hospital case presentation. Dr Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

A. 11. 18 and 19—Quincy City Hospital. Page 654 issue of April 11.

April 24-25—Scientific Section. Academy of Physical Medicine. Page 654, issue of April 11.

April 25—New England Society of Psychiatry. Page 654 issue of April 11.

May 5—Boston Doctors' Symphony Orchestra concert. Nocturne.

May 9—Pennochet Association of Physicians. 8:30 p.m., Hotel Bartlett, Haverhill.

May 10-18—American Scientific Congress. Page 1043, issue of December 28.

MAY 13 — United States Pharmacopoeial Convention Page 202, issue of February 1
 MAY 21-22 — Massachusetts Medical Society Annual meeting Boston
 JUNE 4-7 — American Association of Industrial Physicians and Surgeons. Page 654 issue of April 11
 JUNE 7-8 — American Heart Association Page 469 issue of March 14
 JUNE 7-10 — American Board of Obstetrics and Gynecology Page 608 issue of April 4
 JUNE 8 and 10 — American Board of Ophthalmology Page 719 issue of November 2
 JUNE 10-14 — American Medical Association Annual meeting New York City
 JUNE 10-14 — American Physicians Art Association Page 332 issue of February 22
 JUNE 23-25 — Maine Medical Association Annual meeting Rangeley Lakes
 OCTOBER 8-11 — American Public Health Association Page 655 issue of April 11
 OCTOBER 21 — American Board of Internal Medicine Inc Page 369, issue of February 29

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MAY 8 — Annual meeting Salem Country Club Peabody

FRANKLIN

MAY 14 — Franklin County Hospital Greenfield

HAMPSHIRE

MAY 8 at 11 30 a.m. at the Cooley Dickinson Hospital Northampton

MIDDLESEX EAST

MAY 15 at 12 15 p.m. at the Unicorn Country Club Stoneham

MIDDLESEX NORTH

APRIL 24

JULY 31

OCTOBER 30

NORFOLK SOUTH

MAY 2.

PLYMOUTH

APRIL 18 — State Farm

MAY 16 — Lakeville State Sanatorium Middleboro.

SUFFOLK

APRIL 24 — Annual meeting in conjunction with the Boston Medical Library Election of officers Page 697

MAY 2 — Censors meeting Page 244 issue of February 8

WORCESTER

MAY 8 — Worcester Country Club Dinner at 6:30 p.m. followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

Displacement of the Calcified Pineal Body in Roentgen Pictures as an Aid in Diagnosing Intracranial Tumours An anthropometrical-statistical analysis Bengt Lilja Acta Radiologica Supplementum XXXVII 183 pp Stockholm P A Norstedt & Söner, 1939 Swed. Cr 10

King Gustaf V's Stockholm Jubilee Clinic for Radiotherapy and Research in Cancer A description Gösta Forssell, Elis Berven, Olle Reuterwall and Rolf Sievert. Acta Radiologica Supplementum XXXVIII. 80 pp Stockholm P A. Norstedt & Söner, 1939 Swed. Cr 8

Cancer in Childhood And a discussion of certain benign tumors Edited by Harold W Dargeon 114 pp St. Louis C V Mosby Co, 1940 \$3.00

Compendium of Regional Diagnosis in Lesions of the Brain and Spinal Cord A concise introduction to the principles of localization of diseases and injuries of the nervous system Robert Bing Translated and edited by Webb Haymaker Eleventh edition. 292 pp St. Louis C V Mosby Co, 1940 \$5.00

Frontier Doctor Urling C Coe. 264 pp New York The Macmillan Co, 1940 \$2.50

Treatment of War Wounds and Fractures With special reference to the closed method as used in the war in Spain J Trueta. 146 pp New York Paul B Hoeber, Inc., 1940 \$2.50

Psychological Studies in Dementia Praecox Isabella Kendig and Winifred V Richmond. 211 pp Ann Arbor Edwards Brothers, Inc., 1940 50c.

Fundamentals of Dentistry in Medicine and Public Health John O McCall. 161 pp New York. The Macmillan Co, 1938 \$2.75

Artificial Pneumothorax Its practical application in the treatment of pulmonary tuberculosis Contributions by Saranac Lake physicians to the studies of the Trudeau Foundation Edited by Edward N Packard, John N Hayes and Sidney F Blanchet. 300 pp Philadelphia Lea & Febiger, 1940 \$4.00

Fractures and Other Bone and Joint Injuries R. Watson Jones 723 pp Baltimore Williams & Wilkins Co., 1940 \$13.50

BOOK REVIEWS

The Rockefeller Foundation Annual report, 1938 515 pp New York The Rockefeller Foundation, 1939

This annual report of the Rockefeller Foundation covers, as usual, the work of the International Health Division, reports of the divisions on medical sciences, natural sciences, social sciences and the humanities and the work in China. In addition, there are the reports of the secretary, the president and the treasurer. There is an excellent index, and a number of illustrations. Such a volume cannot be easily reviewed for it covers so wide a field.

To those who are interested in what the Rockefeller Foundation is accomplishing and how its large grants of money are being allocated each year, this book is widely recommended. It is interesting to note that the appropriation for medical sciences to the China Medical Board was nearly four million dollars. One of the major activities of the Foundation has been in relation to psychiatry, neurology and related subjects. In 1938, it helped to develop departments of neurology and psychiatry in five medical schools, with the expenditure of over two million dollars. In looking to the future, the president points out that fields of medical research which might be expanded include chemotherapy, dermatology, pharmacology, legal medicine, industrial medicine, dentistry, public health and the diseases of advancing years.

Handbook of Orthopaedic Surgery Alfred R. Shands, Jr. In collaboration with Richard B Raney. Second edition. 567 pp St. Louis C V Mosby Co, 1940 \$4.25

The first edition of this book has found a definite place in the teaching of orthopedic surgery to medical students and is valuable to those in general practice because the essentials are briefly stated, and the subjects well covered. The new edition is smaller than the first, chiefly because the paper is thinner, rather than because of changes in material. The book is divided into twenty-four chapters, corresponding to the number of hours ordinarily devoted to lectures on the subject in the average medical school.

The illustrations are made up of line drawings, there being no direct reproductions of x-ray films or pathologic specimens. This makes for simplicity without affecting the value of the book for teaching purposes. A valuable part of both the first and second editions, especially for medical students, is the current bibliography, rather selective, corresponding to each chapter and confined to the English language. This gives the student a chance for further reading without making too many demands in the searching for collateral titles.

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THE RATIONALE AND TECHNIC OF SYMPATHECTOMY FOR THE RELIEF OF VASCULAR SPASM OF THE EXTREMITIES*

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TIME and experience have shown that any operation having for its purpose the interruption of sympathetic impulses to the blood vessels of the extremities must fulfill three qualifications. First, it must be anatomically complete. Second, it must be physiologically sound. Third, it must be performed in a manner that guards against the regeneration of nerve fibers. The object of this paper is twofold. First, these three matters will be briefly discussed. They have been considered in greater detail elsewhere.¹ Second, the operative technique that I have found best to satisfy these requirements in the case of both the upper and the lower extremity will be described.

To say that an operation must be complete would appear to be an unnecessary statement. If the anatomical arrangement of sympathetic motor pathways to the extremities had been better understood, this would not have been such a difficult problem with which to cope. Obviously, one should know not only the exact segments of the cord that supply vasomotor and sudomotor fibers to the extremities, but also their exact course through the sympathetic trunk after emergence from the spinal cord by way of the white rami communicantes. While this knowledge is not complete, enough is known to state which portion of the outlying sympathetic trunk should be interrupted in order to produce the desired effect. This information has been acquired only by trial and error, and by careful observation of the clinical effect of various operative procedures. The anatomical details will be given in the description of operative technic.

For many years, physiologists have known that a sympathetic motor nerve is composed of two parts. The first portion extends from the gray matter of the cord to an outlying sympathetic gan-

glion. The latter point is reached by way of the anterior roots and white communicating rami. The second portion extends from the ganglion, where the synapse between the two lies, to the blood vessel wall in which the fiber terminates. This point is reached by way of gray communicating rami and the peripheral nerves.

Immediately after a blood vessel is completely disconnected from central vasoconstrictor impulses, maximal relaxation of the arterial smooth muscle follows. This results in maximal blood flow to the part. By the end of three weeks, however, the arteries regain a certain amount of their tone, and a compensatory mechanism for increasing this tone in response to pain, cold and emotion appears. Thus circulating hormones, adrenaline in particular, carried in the blood stream to the vessel wall, are able to produce vasoconstriction.^{2,3} It has been demonstrated beyond doubt that if the second or postganglionic portion of the pathway has been divided, this compensatory humoral action is approximately three times as great as that resulting from division of the first or preganglionic portion.⁴ Hence it becomes apparent that a surgical procedure should, so far as possible, interrupt only preganglionic fibers in order to produce maximal vascular relaxation and maximal blood flow to the part, and to minimize residual vasoconstriction due to this humoral mechanism. An operation therefore should be complete and, furthermore, preganglionic in type.

The ability of sympathetic motor nerves to regenerate makes it imperative to take steps to guard against this action in order to obtain lasting results. Time has shown that a wide separation of the divided ends of the resected nerves is the best assurance against regeneration. The lumbar portion of the sympathetic trunk with its long communicating rami enables one to perform a wide resection of these structures, resulting in adequate separation of the divided parts (several centimeters). At the same time, the location of the

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synapses is such that a preganglionic type of operation can be done

In the case of the upper extremity, however, the problem is much more difficult. Here, the length of the ramus is short. Wide resection of the trunk and ganglia concerned results in a postganglionic type of operation, and even so has been found not to prevent regeneration. It has therefore been necessary to resort to section of the anterior roots within the arachnoid, and to separate the divided ends of the trunk widely. The details of this maneuver will be considered under operative technique.

THE UPPER EXTREMITY

General Considerations

The operation to be described is the result of years of trial and error. Many different procedures have been utilized. The difficulties encountered have been previously reported by me⁶ as well as by others^{6, 7}. The present operation has been used in principle for nearly five years. Several modifications have been made. The technique to be described has been in use for nearly two years, and is reported in detail in its present form because I believe that the results are satisfactory, and that no fundamental changes will be necessary.

Anatomically, the sympathetic outflow from the second and third dorsal segments is interrupted by dividing the anterior roots of the second and third intercostal nerves within the arachnoid. The sympathetic trunk is sectioned below its third ganglion. The upper sectioned end is sutured into the wound, the distal end being ligated. This results in a complete sympathetic denervation of the upper extremity, with the exception of any fibers that may be contained in the first dorsal nerve. There is no feasible way to section the outflow from this segment in man in a manner that will prevent regeneration and not cut postganglionic pathways or somatic motor fibers running to the arm. Experience has shown that the sympathetic supply to the arm from this source is not sufficient to be of clinical importance. This operation guards against regeneration because the anterior roots are divided within the arachnoid. The proximal cut ends are therefore within a watertight compartment, and after the meninges heal, regeneration should be impossible. Also, not only are the divided ends of the sympathetic trunk widely separated, but also the upper end is outside the thorax, the lower within. The operation meets the stated requirements of being adequate and preganglionic in type and of guarding against regeneration.

Operative Technique

Under intratracheal anesthesia, a vertical paravertebral incision is made, 7 cm. long and about

5 cm. lateral to the midline. It is centered opposite the space between the second and third dorsal spinous processes. The trapezius fibers are divided transversely for 4 cm. in the center of the wound. The underlying rhomboid muscle is split in the direction of its fibers. A finger can then be passed upward and downward beneath this muscle, and the third rib accurately identified. The inner 4 cm. of this rib is removed through a vertical split in the longissimus capitis muscle. The tip of the transverse process is resected and the underlying rib fragment beveled. The pleura is gently separated to the midline of the vertebral column, to above the second rib and to a point below the fourth rib (Fig. 1).

The third intercostal nerve is next divided at the lateral border of the incision. It is held in a hemostat and lowered into the wound. Dissection is

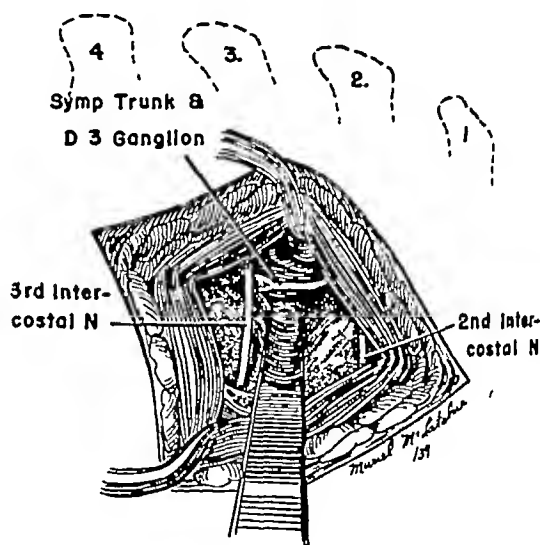


FIGURE 1

carried medially along the nerve, dividing first the gray ramus, second the dorsal branch and finally the white ramus. The posterior root ganglion is then clearly seen. A dental spatula can be slipped between the anterior and posterior roots. The latter is divided just proximal to its ganglion, exposing the anterior root as the sole remaining structure. The meninges are gently pushed inwardly along this root until the white, glistening intraspinal portion is brought into view. This is divided, the proximal end retracting within the arachnoid. A spinal-fluid leak of no consequence results from this maneuver. A sketch of a typical specimen of an intercostal nerve removed is shown in Figure 2.

The same procedure is carried out in the case of the second intercostal nerve (Fig. 3). The final step is to divide the sympathetic trunk below the third ganglion (Fig. 4). The distal end

is ligated within the thorax. The proximal end is brought out and sutured into the muscles of the incision (Fig 5). More recently, the decentralized second and third dorsal ganglia have been covered with a fine silk cylinder to guard further against regeneration. Occasionally an opening in the pleura is inadvertently made. It is best not to try to close it, no difficulty will be encountered if the lung is fully expanded and the extrapleural

removal of the first, second and third lumbar ganglia results in complete sympathetic denervation of the thigh and leg. Removal of the second and third ganglia results in a nearly complete denervation of the leg from the knee distally, but the effect on the thigh is not necessarily complete. The

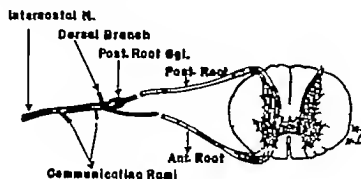


FIGURE 2.

air space obliterated by positive intratracheal pressure before closing the wound tightly. Drainage is never instituted. Silk suture technic is used. The upper extremities are always denervated separately, about a week apart. There have been no deaths and no serious complications. Between January 24, 1935, and November 1, 1939, one hundred and forty-two upper extremities (82 patients) were denervated by this type of operation.

THE LOWER EXTREMITY

General Considerations

Anatomically, the lower extremity is best denervated by excision of a portion of the lumbar

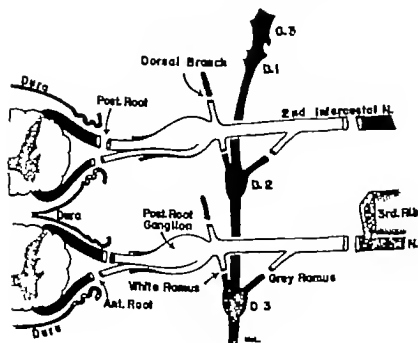


FIGURE 3.

trunk. This contains four ganglia as a rule, but anatomical variations are common. Study of the postoperative effects of interruption of various portions of the lumbar trunk has shown that re-

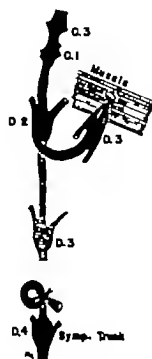


FIGURE 4

former operation is preferable from the point of view of completeness, but has the disadvantage of interfering with ejaculation in men, owing to excision of the first lumbar ganglion. Both pro-

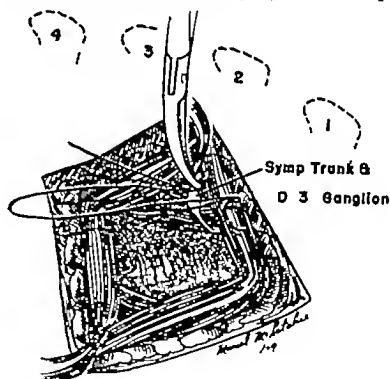


FIGURE 5

cedures interrupt largely preganglionic fibers running to the leg below the knee, and both seem extensive enough to prevent any regeneration of consequence. Removal of the fourth ganglion adds nothing to the completeness of the operation, and has the disadvantage of interrupting postganglionic fibers running to the lower leg. Most of these arise in the fourth lumbar and upper two or three sacral ganglia.

Sympathetic denervation of the lower extremity as described above is adequate, is largely preganglionic in type and ensures against regeneration of interrupted nerve pathways. As a routine procedure, excision of a portion of the lumbar trunk, including its first, second and third ganglia, and resection of the corresponding communicating rami are practiced in women. In men, the first lumbar ganglion and its communicating rami are not disturbed unless it is thought that the underlying vascular problem justifies their removal. The clinical results so far as relief of vascular spasm is concerned are uniformly satisfactory. Between May 26, 1936, and November 1, 1939, one hundred and three lower extremities (62 patients) were denervated by this technic. There was 1 death due to a pulmonary embolus.

It can be seen that the main purpose is to expose the upper portion of the lumbar sympathetic trunk. Experience has shown that this region is best approached by the extraperitoneal route. If both sides are to be done, the operations are spaced one week apart. This approach is far superior to the transperitoneal operation, which we used extensively up to three years ago. Such a laparotomy is a much more difficult task, and subjects the patient to unnecessary risk and discomfort. Its field of application must necessarily be narrowed to good-risk patients and to those who are certain to derive great benefit from it. Moreover, it is almost impossible to remove the first lumbar ganglion by this route, and often the second ganglion is reached with difficulty if at all. Frequently the third and fourth ganglia are removed, an undesirable step for reasons previously stated. The only advantage of the abdominal approach is that both lower extremities can be denervated at the same time. The many advantages of the extraperitoneal route far outweigh this. A number of excellent extraperitoneal procedures have been described.⁸⁻¹⁰ The following one is that which I have found most useful.

Operative Technic

Either general or spinal anesthesia is used. The latter gives excellent muscular relaxation, and perhaps has an advantage in heavily built individuals. Silk-suture technic is preferred. Drainage is never used.

The patient is placed on his side, with a kidney bar in place just above the level of the iliac crest. The operative field is uppermost. Both knees are drawn upward so that the thighs are approximately at a right angle with the abdomen. This relaxes the *iliopsoas* muscle group. A medium-sized pillow is placed beneath the undermost

thigh, a second pillow is placed between the two thighs and the undermost shoulder is drawn forward. All these steps tend to tilt the patient backward toward the operator. This position is maintained by a strap running diagonally over the legs just below the knees, and by a padded support placed against the sacrum and the back in the scapular region. The kidney bar is then elevated, widening the space between the twelfth rib and the iliac crest and stretching the external oblique muscle. This effect can be intensified by lowering the head and foot of the table a little. The final move is to tilt the table so that the plane of the patient's back is 30 to 45° from the vertical position toward the operator. The latter stands facing the patient's back.

An incision is made, starting in the angle formed by the twelfth rib and the sacrospinalis muscle group (Fig 6). It runs anteriorly 1 cm below

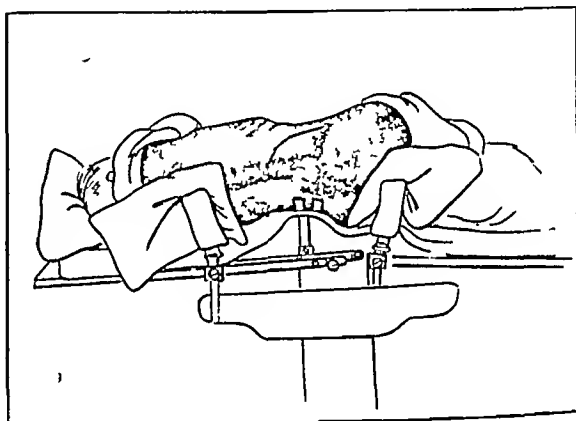


FIGURE 6

the rib to its tip, then curves anteriorly and downward over the posterior border of the external oblique muscle to the iliac crest. It meets the latter at a point about 7 cm posterior to the anterosuperior iliac spine. In the posterior portion of the wound, a few fibers of the latissimus dorsi are cut across. The posterior border of the external oblique muscle as it runs from the tip of the twelfth rib to the iliac crest is dissected out and retracted forward. This exposes the internal oblique muscle, whose fibers are divided for about 2 cm by an incision parallel to the twelfth rib. The lumbodorsal fascia is next incised for 7 cm in the line of its fibers 1 cm below and parallel to the twelfth rib. The twelfth nerve lies just above and the first lumbar nerve just below the incision. The first lumbar nerve is plainly seen running downward and forward along the lateral border of the quadratus lumborum muscle (Fig 7).

A finger is then passed inward, upward and

medially just below the twelfth rib, over the quadratus lumborum and iliopsoas muscles and posterior to the lower pole of the kidney and peritoneum. It meets the vertebral column in the region of the first lumbar vertebra. The sympathetic trunk is readily palpated on the anterolateral aspect of the spinal column. The finger is gently passed from above downward, separating the peritoneum from the iliopsoas and quadratus lumborum muscles until the trunk has been exposed to be low its third ganglion.

A loog, moist strip of gauze is gently inserted against the peritoneum, and the latter, including the ureter, and also the vena cava or aorta, can

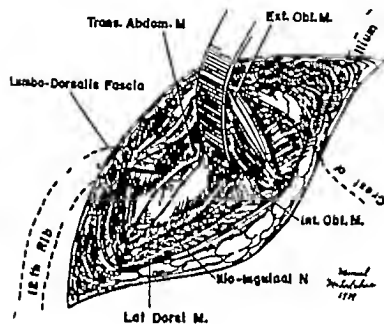


FIGURE 7

then be gently retracted upward and anteriorly with a long, curved retractor such as the Dever type (Fig 8). Because of the position of the patient, one can look directly at the sympathetic trunk over the iliopsoas muscle group. It is not necessary to use any posterior retraction except for lighting purposes. The sympathetic trunk is plainly seen, with its second and third ganglia and sets of communicating rami. The first lumbar ganglion and its rami as a rule cannot be perceived until the avascular fascia of the lumbocostal arch has been divided in an upward direction for about 2 cm. On the right side, lumbar veins running into the vena cava may cross over the trunk. This is particularly true of a large, constant branch just below the communicating rami of the third lumbar ganglion. The desired

portion of the sympathetic trunk and communicating rami can then be readily removed. This step is facilitated by special instruments, among

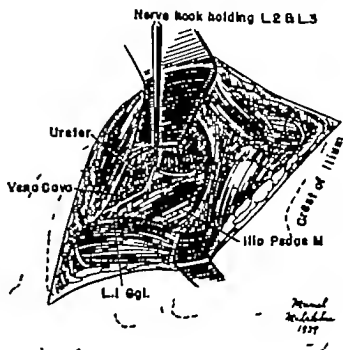


FIGURE 8.

which long Crile hooks and Hartman forceps are particularly useful.

SUMMARY

The rationale of sympathetic denervation of the extremities is discussed.

The surgical technic that I have found to give the best clinical results in the case of both the upper and the lower extremities is described in detail.

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COMPRESSIONS OF THE VERTEBRAL BODIES DURING CONVULSIVE THERAPY*

Preliminary Note Regarding Their Prevention

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IN A recent publication by one of us (E F¹), in which a comprehensive search for complications of convulsive therapy of the psychoses was attempted, hardly pertinent data could be gleaned from the reports of seventy-five clinics with reference to vertebral injuries. The surprising scarcity of subjective complaints referable to the back, even in patients who demonstrate a tendency toward hypochondriasis during convulsive therapy, —seeking any excuse to be released from treatment,—is probably responsible in great part for the belated recognition of this mechanical complication. Another possible cause is the often severe divergence in interest between psychiatric and orthopedic workers. It is believed in retrospect that had an experienced orthopedic surgeon viewed a number of therapeutic convulsions during the incipient days of convulsant therapy, most of the now better-known mechanical complications might have been prevented, such as was done in the preventing of fractures or dislocations at the shoulder and hip joints by methods suggested in the previous paper.

In view of the relatively recent reports by Polatin et al.,² Stalker,³ Wespi,⁴ and Bennett and Fitzpatrick⁵ regarding dorsal compressions, we have referred to their data concerning accidental compression injuries of the vertebrae. From these sources the uniform conclusion is evident that vertebral compressions occur almost exclusively when the vertebral column is in the flexed position. The similarity between this position in accidental compression and that of the spine during the induced convulsive process is explained in greater detail below.

ANATOMICAL AND ORTHOPEDIC CONSIDERATIONS⁶

The underlying structural peculiarities of the dorsal spine that tend to facilitate compression injuries of this region during induced grand-mal reactions may be briefly described. The dorsal curvature is the first of the spinal curves to develop or to be noticed phylogenetically, it is the first to become fixed in normal skeletal development. The dorsal vertebrae, in contrast to those of the cervical and lumbar regions, form normally

an anterior concavity which in the assumption of the upright position brings about a thinning of the anterior portion of the intervertebral fibrocartilage. The disks as well are generally thinner in this region. In the thoracic spine practically all intrinsic movements are limited in order to facilitate respiratory movements via the costophrenic mechanism. The angulation of the superior articular surfaces of the dorsal vertebrae and the contiguity of the inferior articular surfaces and the laminae, together with the approximation of the dorsal spinous processes with each other, inhibit to a great extent respectively flexion and extension movements of the dorsal spine. This architecture and the distribution of the muscles of the trunk, with special favoring of the cervical and lumbar regions, combine to make for a unitary function of the dorsal spine in ordinary locomotion as well as in cases of trauma by a force acting vertically downward and thus directed on the lumbodorsal junction. On the other hand, if the direction of the force becomes reversed the tendency toward involvement of the cervical region, that is the impingement of the dorsal vertebrae as a unit, is evident. Another important feature in spinal injuries is the placement of the anterior and posterior common ligaments, which are essential for holding the vertebral bodies together. The posterior group is much more extensive and is strengthened by the adjacent interspinous and supraspinous groups, as well as by the intertransverse and interlaminar ligaments.

So long as there is a hyperflexion of the vertebral column in a given region, the requisite force imposed on it need not be great in order to cause a compression fracture of the spongy vertebral body. The force required may be even less than that which obtains in normally active people. Various undetermined factors of relative decalcification in the vertebral bodies of patients inactive for years may also play a part—the so-called bone atrophy of disuse. The immediate force must simultaneously compress the vertebral region along its longitudinal axis and flex it. The movable vertebral portion becomes fixed after sudden movement, and the momentum of the vertebral portion above this region crushes the intermediate vertebral bodies. As already mentioned, the compressions occurring in industrial orthopedic practice are found

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chiefly at the junction of the dorsal (relatively rigid) vertebrae with the lumbar or cervical (relatively flexible or resilient) regions. But this condition obtains with the spinal column perpendicular, which is not the case during the induced convulsive procedure wherein force is exerted with the column horizontally disposed. With this in mind, we come to the consideration of the mechanical factors attending the grand mal reaction per se.

The actual pattern of the Metrazol, or camphor induced, seizure has been described elsewhere.¹ The phases of this reaction in which vertebral compressions are likely to occur are the tonic

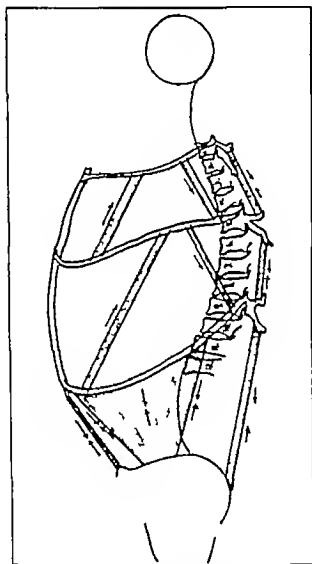


FIGURE 1

Schematization demonstrating relative extension and flexion muscular forces on the thoracic spine. The excessive leverage of the spinoflexors using the ribs as levers is quite apparent.

and the clonic. In the former the force directed on the vertebrae acts almost continuously, somewhat similar to that observed in tetanus and similar conditions*, in the latter the contractures occur in a rhythmically interrupted fashion. The tonic phase imposes a grinding type of action, the clonic phase a hammering type. In either case, an undetermined number of patients will undergo a predominantly opisthotonic phase, while others will demonstrate orthotonos, even em prothotonos. In the last two forms, particularly, the normal or accentuated dorsal curvature be-

comes the locus of converging forces. As already stated, the trunk musculature is concentrated either adjacently inferior or superior to the dorsal region, the pelvic and lower limb and the craniocervical sections jerk in opposing directions, the area of stress being the arch of the relatively rigid dorsal spine. It would appear that this phenomenon, together with the leverage of the anterior thoracic and abdominal muscles exerted through the ribs as spinoflexors during the grand mal reaction, is directly responsible for midthoracic vertebral compressions. The leverage of the anterior group of muscles appears to be proportionately many times greater than that of the posterior group, which is close to the spine itself (Fig. 1).

STATISTICS

A series of 69 patients have been treated to date by an extensive and as yet incomplete program of convulsive irritative therapy. Four patients had already been discharged on visit at the time of this study and were not available for x-ray examinations. Roentgenological examinations were completed on the remaining 65 patients, lateral, dorsal and lumbar plates being taken of each. Thirteen control patients were similarly studied. The technical details of management of this routine has been described elsewhere.¹ Here, however, we may state that the original measures to prevent mechanical complications consisted only of the application of sheet bands about the lower deltoid and mid-thigh regions so as to allow flexion extension of the upper and lower extremities but to prevent abduction of the shoulder and hip joints. Additional preventive measures were undertaken later, after it was learned that vertebral compressions might occur during the induced convulsions. This knowledge was obtained only after the courses of treatment had advanced to the degrees noted in Table 1.

No complaints referable to the back were offered, with 1 exception, this patient had negative

TABLE 1 Cases with Compression Fractures

| CASE | NO. OF INDUCED CONVULSIONS | DORSAL VERTEBRAE INVOLVED |
|-------|----------------------------|---------------------------|
| P. P. | 26 | 6 |
| A. C. | 14 | 6 |
| B. K. | 23 | 5, 6 |
| G. M. | 25 | 6, 7 |
| A. N. | 34 | 7 |
| A. K. | 30 | 8, 9, 10 |
| S. S. | 13 | 5, 6, 7 |
| J. C. | 7 | 7, 8, 9 |
| J. H. | 22 | 7, 8, 9, 10 |
| G. L. | 37 | 3, 4 |
| W. C. | 35 | 4, 5 |

x ray findings. Physical examinations of the back and neurological examinations were negative. There were 11 cases of vertebral injuries that con-

formed in a general way to the diagnoses of compression fractures of the vertebral bodies. The diagnoses were based entirely on x-ray findings. These findings are listed in Table 1, together with the number of grand-mal reactions induced up to the taking of x-ray films.

One additional case of vertebral compression might be mentioned at this point. The patient, during a determined effort at escape from the hospital, jumped or fell from a second-story window. He sustained fractures of the left os calcis and left elbow. A slight compression of the eighth dorsal vertebral body was also found. From the

TABLE 2 *Observations in Control Cases*

| CASE | INTERPRETATION |
|------|--|
| P C | Apparent bulging of the nucleus pulposus between four lumbar vertebrae (2 3 4 5) probably old |
| D B | Narrowing of the disk between two lumbar vertebrae (1 2) probably old |
| C W | Bodies of six dorsal vertebrae (5 6 7 8 9 10) slightly narrowed (the uniformity of this narrowing was indicative of a postural factor) fairly marked dorsal kyphosis |
| D M | Slight narrowing of the body of one dorsal vertebra (12) not of recent origin probably the result of an injury in early life. |

nature of the other injuries the latter finding could reasonably be attributed to the same accident.

It is of interest that only the thoracic vertebrae were involved, the tendency toward involvement of the centrally located bodies should also be noted. This may be contrasted with the involvement after accidental trauma wherein compressions rarely occur above the lowermost dorsal region. In every case the injury occurred in a patient who for a number of years before treatment had been classed as sedentary and hypokinetic. The single exception occurred in Case A C, that of one who had been active as a laborer and had participated in various entertainments, taking the part of an acrobat. We cannot now prove whether or not this activity was a factor in the presenting injury. There was no correlation between the number or apparent severity of reactions and the occurrence of compressions. For the most part these injuries were not complete fractures of the whole vertebral body, but compressions of one or more of the anterior, superior and inferior portions, causing various degrees of wedging with the base of the vertebral body spared,—again in contrast to that which obtains in industrial work,—accounting, probably, for the absence of local pain in post-convulsive cases.

The possible predisposing factors seem to be as follows: an underlying postural or osteoporotic disorder, and a temporarily co-existing mechanical feature in the handling of the patient during the induction of the convulsion. Although in this paper we intend to emphasize the latter factor, the

former must not be neglected. To date, adequate laboratory or roentgenological data to prove the existence of a calcium-phosphorus metabolic disorder are not available. Yet the impression can not be dismissed that prolonged relative inactivity of the musculoskeletal system makes it more vulnerable to mechanical injuries, at least two text books⁹ refer to such an osseous condition as porosity from inactivity, and it is commonly called the atrophy of disuse.

In an attempt to gauge the possibility of pre-existing postural deformities that might contribute to an orthopedically significant extent to vertebral complications, 13 patients were chosen for x-ray examination of the spine. They were selected arbitrarily, with the mental reservation that they might later be given a course of convulsive irritative therapy. None of the patients received con-



FIGURE 2 *Case S S*

vulsive therapy. The observations in 4 of the cases are given in Table 2.

It is perhaps not strictly accurate to class these as control cases of a convulsion-treated group. However, the fact can by no means be disregarded that roentgenologically evident postural deformities do exist in a significant number of the total hospital population. Depending on the type of psychiatric ward, that is in reference to the chronicity of the illness for which the cases are segregated,

in the long standing hypokinetic cases a variety of postural deformities are commonplace, chief among these being kyphoses, round backs and stooped shoulders. We believe that the abundance of these deformities might easily be overlooked in everyday intramural psychiatric prac



FIGURE 3 Case J H

tice were it not for some unusual occurrence or set of observations such as prompted the writing of this paper. Of the group herein described existing deformities were outstanding in over 30 per cent. Vertebral compressions occurred in less than 17 per cent after treatment—we must express it thus since x-ray studies were not made before treatment was instituted.

In Figure 2 there is depicted our most severe vertebral compression as a result of treatment. This patient (Case S S) received a total of thirteen convulsions. The x-ray interpretation is compressed fractures of the fifth, sixth and seventh dorsal vertebrae, with the width of the body of the sixth reduced to about half normal. Further analysis indicates the probability of a pre-existing kyphotic postural deformity. The greatest strain was apparently directed on the central thoracic vertebrae

Our next severest injury is shown in Figure 3, which illustrates the dorsal spine of a patient (Case J H.) after undergoing twenty-two convulsions. The interpretation is definite compression of the seventh, eighth, ninth and tenth dorsal vertebrae. If we now compare the foregoing with one of the controls (Case C W), as shown in Figure 4, we have for the latter the following interpretation: the bodies of the sixth, seventh, eighth, ninth and tenth dorsal vertebrae are narrowed, the uniformity of this narrowing is, however, indicative



FIGURE 4 Case C W

of postural disturbance, there is a fairly marked dorsal kyphosis. This case indicates how much of a dorsal kyphotic deformity can exist in a patient before treatment is undertaken. The strain during an induced convulsion, or rather repeatedly induced convulsions, would again be directed to the area of greatest curvature, namely the central dorsal vertebrae. So that were not some type of preventive measure undertaken one might almost visualize the area of subsequent compression during induced convulsions.

Figure 5 depicts our least severe injury (Case A C.) The interpretation is narrowing of the sixth dorsal vertebrae. If we compare this with the film (Fig 6) from another control (Case

D B), wherein the interpretation is narrowing of the disk between the first and second lumbar vertebrae, probably old, a definite mechanical predisposing factor can be made out

PREVENTIVE MEASURES

Perhaps the most outstanding and, to the orthopedist, most obvious factor with reference to vertebral compressions in the actual administration of the therapeutic convulsion is the manner



FIGURE 5 Case A C

in which the patient lies in bed at the time of the attack. As seen from Figure 7, the bed used in most state hospitals allows the patient to be suspended, so to speak, with the entire vertebral axis in an anteflexed position, which permits, if anything, an accentuation of any underlying, even mild, kyphosis. In a patient who is a little heavier than normal the vertebral column is proportionately more flexed. There is permitted more intimate contact of adjacent thoracic vertebrae. We, along with many other workers, have been accustomed to support firmly the shoulders and lower extremities during the reactions, by direct manual means as well as by the sheet bands already mentioned. Whereas this method prevents

excessive excursions of the limbs in any direction, it may possibly be an additive factor in causing vertebral compressions, in so far as the added weight of the attendant nurse promotes further sagging of the bed.

After careful consideration of the factors involved in the causation of mid-thoracic vertebral compressions, it was believed that orthopedically the most practical manner of preventing these injuries was to bring about hyperextension of the vertebral column, and at the same time prevent excessive intervertebral impingement at the time of the convulsion, in other words, to offset the lever advantage of the vertebral anteflexor muscles.



FIGURE 6 Case D B

The first measure employed was to place a specially constructed reinforced bolster under the patient's back so as to take up the sag of the bed, and to permit hyperextension of the spine by appropriate maneuvering. This method was workable, but it was found that a certain bolster did not comfortably fit all patients, and considerable maneuvering had to be done in many cases in order to obtain the necessary amount of hyperextension. In

other words, a bolster would have to be constructed for each patient, or else five or ten minutes would be consumed in properly applying this support before beginning treatment. This method also caused a certain amount of pretreatment apprehension, a feature that one must continually guard against in routine convulsive irritative therapy

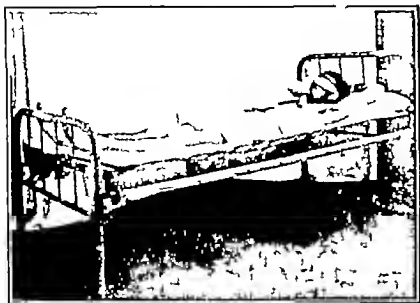


FIGURE 7

On inspection of the various uses of standard surgical beds, we observed that if the patient was put into the bed with his head toward its foot, the appliance on this bed ordinarily employed for elevating and flexing the knees was quite suit-

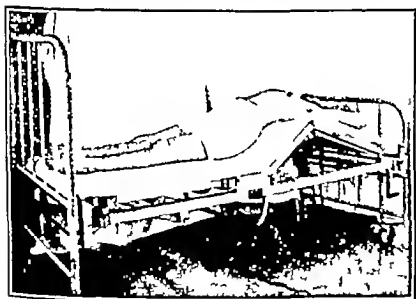


FIGURE 8

able for our purpose. There was thus available an easily adjustable frame that provided adequate hyperextension of practically the entire spinal column. It was further observed that by means of manual pressure at the shoulders and thighs during the convulsive reaction a maximum amount of intervertebral spacing was achieved. Figure 8 shows the application of the knee support of a standard surgical bed for purposes of hyperextension of the vertebral column. Figure 9 demonstrates the roentgenological evidence of dorsal hy-

perextension obtained by this method. This plate was taken with the patient lying on the support. During the treatment procedure, of course, the arms and thighs are held medially by means of sheet bands. The patient is placed in bed horizontally, the sheets are applied and the support is raised just prior to the administration of Metrazol. During the entire reaction the shoulders and thighs are firmly held down on each side of the mid-thoracic angulation by attendant nurses. In order to prevent over hyperextension of the cervical and lumbar vertebrae, a pillow is placed under the head and the hips are firmly pressed in a downward direction. Immediately after the reaction the support is lowered and the sheet bands are removed.



FIGURE 9

It has been noted that in each case where this method was employed an opisthotonic phase developed which tended even to increase the hyperextended vertebral position in which the patient was placed before the reaction. Up to the time of this report we had employed the above method in conducting the convulsive routine in the cases of 16 patients who had each undergone twenty grand mal reactions. Lateral lumbar and dorsal x-ray films taken before and after these courses of convulsive treatment revealed no cases of vertebral injury of any type. If one compares these courses of treatment with those of the patients mentioned in Table 1, the two may not appear equivalent. However as already demon-

strated by Polatin et al.,² compressions of the vertebrae may occur even after a single induced convulsive reaction, consequently it would be impossible for us to state with certainty when the compressions occurred with reference to the number of seizures undergone in the first group of patients

SUMMARY

1 Sixty-five chronically institutionalized psychotic patients were treated by an extensive regime of convulsive irritative therapy. It was found by routine x-ray studies of the dorsal and lumbar spines of all these patients that there had occurred 11 cases of single or multiple compressions of the vertebral bodies, all confined to the mid-dorsal region

2 None of the patients in whom vertebral compressions had occurred offered any localizing complaints, nor were any neurological or physical findings evident

3 No relation could be demonstrated between the occurrence of these compressions and the number and severity of the induced convulsions. With one exception, all patients were of the chronic sedentary, inactive type

4 Anatomical and orthopedic considerations of these findings led to the impression that certain mechanical predisposing and precipitating factors were present. Predisposing factors in the form of kyphoses, ruptured disks and even old compressions of the vertebral bodies were noted in 4 out of 13 control cases. Osseous porosity from disuse might also have been important, but the presence of this factor could not be proved. Precipitating factors were caused by the convulsive procedure per se. These consisted of sudden

flexor activities of the trunk musculature which predominated over simultaneous extensor movements because of the extreme leverage of the flexor group of muscles. The already fixed, flexed posture of the dorsal spine accentuated by the sag of the bed during treatment seemed to bring about a convergence of the intermittently acting muscle forces on the arched portion of the dorsal spine, wherein were found all the compression injuries

5 A workable, practical, preventive measure was demonstrated. This consists of employing the knee-support of the standard surgical bed as an adjustable vertebral hyperextension frame. This appliance seemed to prevent the occurrence of compression injuries to the vertebrae in a series of 16 consecutive cases

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THE RELATION BETWEEN LEUKEMIA AND TUBERCULOSIS*

Report of a Case

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BOSTON

EXAMINATION of the blood is usually the most important procedure in the diagnosis of leukemia. Occasionally, however, the hematologic findings may be misleading; leukemia may be present without typical hematological evidence if it (aleukemic leukemia), or leukemoid blood may be associated with other diseases, especially infections. In the case here reported, a picture typical of chronic myelogenous leukemia was present and led to that diagnosis. Miliary tuberculosis, which was found post mortem, had not been suspected.

The co-existence of leukemoid blood and tuberculosis, usually miliary, has been observed and reported by a number of authors. In a few cases the leukemia was of the lymphoid type; in the majority it was myeloid as in the present case.

CASE REPORT

M. P. G., a 45-year-old widow, entered the Massachusetts Memorial Hospitals on December 19, 1938, with weakness as the most prominent symptom. The family history revealed nothing of importance except that her husband had died of pulmonary tuberculosis in 1926, after they had been married 13 years. She had felt well until the preceding January when she began to tire easily and felt a pulling sensation in the left upper abdomen. Shortly afterward she noticed a lump in that region. She consulted her physician who found an enlarged spleen and made a diagnosis of chronic myelogenous leukemia on the basis of a white-cell count of 180,000 with 58 per cent myelocytes and young forms. Radiotherapy brought about improvement for a time, but later the weakness increased, fever developed, the lower extremities became edematous, and a skin eruption appeared and about 1 month before entering the hospital the patient was forced to give up her work as a cashier. About 1 week before admission she began to show signs of an upper-respiratory infection with cough, coryza and aggravation of all symptoms. She had lost 30 pounds in weight since the beginning of her illness.

Physical examination revealed pallor of the skin and evident loss of weight. Thickly scattered over both arms and legs were many discrete, slightly elevated nodular eruptions measuring 8 mm. in diameter with a central yellow area 3 mm. or less in diameter (Fig. 1). There was edema of both legs. The cervical lymph nodes were markedly enlarged, nontender and moderately fixed. A few enlarged nodes were present in the axillae and groins. Examination of the heart and lungs revealed nothing abnormal. The spleen was firm and nontender and extended

to the median line and to about 3 cm. below the level of the umbilicus. The temperature was 100.2 F. during her stay in the hospital; it varied between 97.0 and 103.2 F. Urinalysis and serological and chemical examinations of the blood gave normal results, with the exception of a low serum calcium (7.3 mg. per 100 cc.). The blood counts (Table 1) and stained films (Fig. 2) were typical of myelogenous leukemia.

Radiotherapy was administered and Fowler's solution was prescribed. Subjective improvement and a decrease



FIGURE 1 Maculopapular Eruption and Swelling of the Cervical Lymph Nodes

in the number of leukocytes followed. The patient left the hospital at the end of 3 weeks. She rested at home for 2 months and then felt well enough to resume her work.

Three weeks later she was readmitted because of weakness, cough, swelling of the abdomen and fever. Physical examination revealed more obvious loss of weight, increased pallor and abdominal distention. A thick post nasal discharge was present; the nasal mucosa was congested. The cervical lymph nodes, although still enlarged, were smaller than they had been at the previous examination. The cutaneous lesions had healed, but brownish spots remained. The ocular fundi were normal. A few scattered moist rales were heard throughout the chest, and

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there were diminution of breath sounds and dullness at the right base, suggestive of hydrothorax. The heart was normal. The distended abdomen was tympanitic except in the flanks and in the left upper quadrant, where there was flatness, evidently from an accumulation of fluid and an enlarged spleen. The splenic enlargement, however, was less marked than before, extending only 10 cm below

TABLE 1 Blood Leukocyte Counts and X-Ray Treatments

| DATE | LEUKOCYTE COUNT | MYELOCYTES % | X RAY TREATMENTS |
|-----------|-----------------|--------------|----------------------------------|
| 2/21/38 | 180 000 | 58 | |
| 3/2 25/38 | | | 6 treatments 50 r each (spleen) |
| 3/28/38 | 65 000 | 57 | |
| 4/4-18/38 | | | 4 treatments, 50 r each (spleen) |
| 4/25/38 | 28 000 | 44 | |
| 5/24/38 | 18 400 | 26 | |
| 7/29/38 | 20 100 | 31 | |
| 10/3/38 | 51 000 | 40 | |
| 12/21/38 | 62 000 | 12 | |
| 12/22/38 | | | 24 r (spray) |
| 12/24/38 | 45 750 | 22 | 10 r (spray) |
| 12/27/38 | 38 500 | 10 | |
| 12/31/38 | 32 500 | | 10 r (spray) |
| 1/3/39 | 56 500 | 14 | |
| 1/9/39 | 28 000 | 11 | |
| 2/20/39 | 46 400 | 39 | |
| 3/21/39 | 83 600 | 46 | |
| 4/7/39 | 44 000 | 8 | |
| 4/12/39 | | | 39 r (spleen) |
| 4/17/39 | 29 700 | 6 | |
| 4/18/39 | | | 39 r (spleen) |
| 4/28/39 | 15,900 | 8 | |
| 5/4/39 | 43 400 | 7 | |
| 5/8/39 | 31 000 | 3 | |

the left costal margin. Neurological examination revealed nothing abnormal. Radiography showed slight symmetrical cardiac enlargement and an old tuberculous calcification in the apex of the right lung. A plain film of the abdomen revealed nothing unusual except the splenomeg-

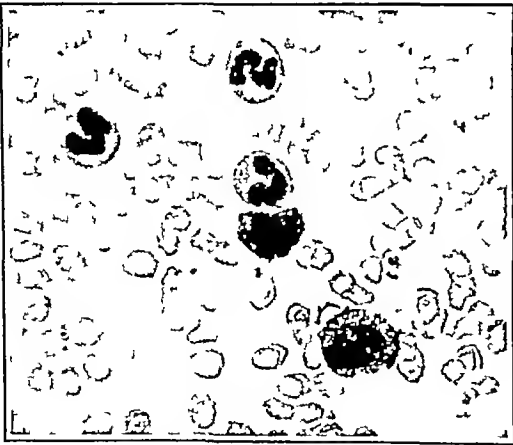


FIGURE 2 Myelocytes in Stained Film of Blood

aly. The electrocardiogram was not remarkable. The basal metabolic rate was +41 per cent. The diagnosis of myelogenous leukemia was accepted by several examiners. The patient gradually failed, finally became comatose and died May 9, 1939.

Autopsy. The peritoneal cavity contained about 8000 cc. of clear, amber fluid. Recently organized fibrous adhesions were found between the intestinal loops, omentum, liver, diaphragm, uterus and ovaries. The omentum was board-like in consistence and profusely studded with numerous small, slightly elevated, grayish-white, milium lesions about

1 mm in diameter. The visceral and parietal portions of the peritoneum presented similar lesions. The right pleural cavity contained 2000 cc. of clear, amber fluid. There were firm adhesions over an old healed calcified scar at the apex of the right lung. The left pleural cavity did not contain fluid but was obliterated by old fibrous adhesions. The spleen weighed 1180 gm. and measured 25 by 15 by 8 cm. Its surface was partially covered by adhesions and by a moderately thick, easily removable, pale yellowish-gray pad of fibrin. The surface of the liver presented a similar appearance. On the cut surface there were pinhead sized grayish spots that suggested myeloid accumulations. All the serous surfaces of the entire gastrointestinal tract, bladder and pelvic organs were studded with milium lesions similar to those found on the omentum. The sternal, vertebral and femoral bone marrows were grossly hyperplastic.

On microscopical examination acute milium tubercles

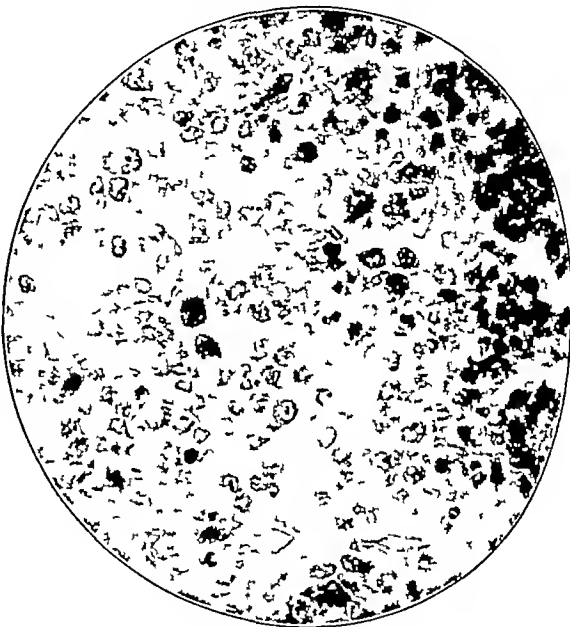


FIGURE 3 Myeloleukemic Infiltration in the Spleen

were found in certain portions of the lungs, with necrotic central areas surrounded by neutrophilic leukocytes, endothelial leukocytes and fibrin. Occasional areas of caseation were present on the capsule of the spleen, with peripheral zones of fibrous connective tissue, phagocytic endothelial cells and rare foreign body giant cells. Scattered throughout the substance of the spleen were many neutrophilic leukocytes, as well as immature forms of granulocytes (Fig 3). The capsule of the liver was covered with many young and moderately developed tubercles. Rare caseous foci were seen in the hepatic parenchyma. Around a few of the portal canals there were small accumulations of myeloid cells, but this was much less marked than is customarily the case in chronic myelogenous leukemia. The intestinal serosa was rather uniformly studded with young and moderately advanced milium tubercles (Fig 4). About the periphery of some of them small zones of leukemoid infiltration were seen. Acid fast bacilli were demonstrated. The mesenteric lymph nodes contained discrete and confluent areas of caseation, and in a few there was a suggestion of early leukemoid reaction. In the sternal, vertebral and femoral bone marrows there was complete replacement of the normal structure by massive accumula-

nons of immature myeloid cells, such as are characteristic of myelogenous leukemia (Fig. 5) Miliary tubercles were not found.

In 1849 Virchow¹ reported what was probably the first recognized case of this type. His patient had a large spleen which filled the whole left abdomen and weighed about 1500 gm. There were miliary tubercles in the pons varoli and in the lungs, pleurae, pericardium, liver and kidneys. Although at that time the methods of ex-

and fulminating miliary form of tuberculosis. The studies of Moreschi and others (quoted by Forkner²) showed that the production of antibodies and the phagocytic activity are diminished in leukemia. Jaffé³ also found that immature leukocytes are deficient in defensive properties.

Susmann,⁴ who believed that the two diseases may exist together, postulated three possible combinations: the tuberculosis is latent and is not affected by the subsequently developing leukemia, it is latent and is activated by the leukemia (this is commonest), it supervenes as a terminal infection.

The fact that leukemic infiltration of the internal organs was lacking in the majority of the cases of combined leukemia and tuberculosis has been used as evidence that the blood picture was leukemoid only and not the result of the disease,

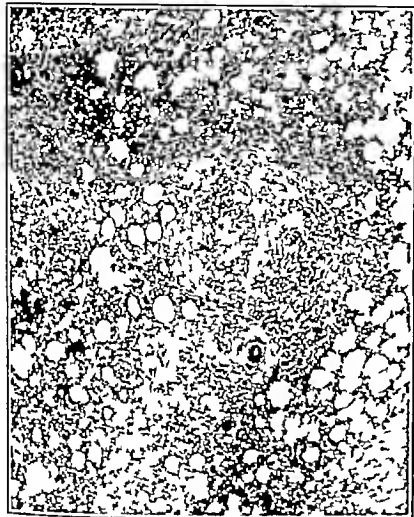


FIGURE 4 Miliary Tubercle in the Wall of the Intestine

amining the blood were in an undeveloped stage, the description of the findings leaves little doubt that the blood was leukemoid in character.

The nature of the relation between leukemia and tuberculosis has puzzled nearly everyone who has observed their association in the same patient. Some authorities have believed that the leukemoid character of the blood is an unusual response of the leukopoietic tissues to the tuberculous infection and not true leukemia, others have maintained that in many cases one disease was complicated by the subsequent or previous occurrence of the other. The fact that in the majority of cases the tuberculosis is of the miliary type may be used as evidence for either conception; that is, leukemoid reactions may occur especially in miliary infections; on the other hand, the lowered resistance assumed to be present in leukemia may permit the development of an acute



FIGURE 5 Myeloleukemic Changes in the Bone Marrow

leukemia. Support for this contention is supplied by results obtained in the experiments of Feldman and Stasney.⁵ They found that rabbits sensitized with tubercle bacilli responded with leukocytosis (up to 124,000 in an animal) to injections of Old Tuberculin, the reaction resembling the so-called "leukemoid reaction" described in human beings. The reactions, however, were of but short duration, lasting only four days or less. The authors assumed that "since the majority of leuke-

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CLINICAL NOTE

SYSTEMIC AND LOCAL REACTIONS
TO EPINEPHRINE IN OIL

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WITH the introduction of epinephrine in oil by Keeney¹ in 1938, the symptomatic treatment of allergic conditions, particularly asthmatic seizures and intractable asthma, has acquired a new impetus. The material can be obtained commercially in ampules, each containing 2.0 mg epinephrine crystals in peanut oil. Since its introduction, this preparation has been employed with increasing frequency by the general practitioner, as well as by the specialist in allergic diseases. Although epinephrine in oil is a valuable therapeutic weapon, the physician should be cognizant of its frequent untoward results that may follow its use. Murphy and Jones² presented a series of 9 cases in which epinephrine in oil was employed. These authors note in 1 patient untoward systemic reactions characterized by nervousness, insomnia, palpitation, nausea vomiting and headache. No local manifestations were observed. Cohn³ reports 4 cases in which epinephrine in oil was used with the following unusual symptoms: nausea, vomiting, dizziness, vesicular urticaria, cyanosis, increased dyspnea and local edema.

Since its introduction I have employed this preparation on 14 patients who did not respond to the usual measures. All these patients were markedly benefited. However, with 2 of them there were untoward reactions each time the preparation was injected. In one, systemic symptoms, such as cold hands and feet, chilly sensations, clammy perspiration, facial pallor, frontal headache and cardiac palpitation; in the other, local manifestations characterized by a preliminary blanching followed by redness, intense itching, marked edema and inflammation at the site of the injection. The routine of administration was as follows: 10 cc. of epinephrine hydrochloride solution (1:1000) was injected subcutaneously, followed with ten minutes with 1 cc. of sterile peanut oil containing 2.0 mg of epinephrine injected intramuscularly, the plunger of the syringe always being pulled back before injection, in order to be certain that the preparation was being injected directly into the muscle and not into a blood vessel.

CASE REPORTS

CASE 1. J. B., a 37-year-old man, had suffered from bronchial asthma for the previous 18 years. History and tests revealed that the patient was sensitive to both pollen and bacterial products. He was continuously dyspneic. His asthmatic seizures were severe and lasted for 72 hours occasionally even for more than a week, after which symptoms would clear completely only to return within

a few days with a renewed intensity. During these episodes, the patient administered to himself adrenalin chloride vapor (1:100) at very frequent intervals. Oxygen inhalation was resorted to frequently and 0.5 to 1.0 cc. of adrenalin chloride 1:1000 was subcutaneously injected every one or two hours.

When first seen the patient was having a very severe asthmatic seizure, which had failed to respond to the above self-administered measures. Four tenths of a cubic centimeter of epinephrine hydrochloride (1:1000) was injected subcutaneously. This was immediately followed by an injection of 1/75 gr of atropin sulfate. Shortly afterward the dyspnea began to abate. Ten minutes later an intramuscular injection of epinephrine in oil was given. Within a few minutes the patient complained of feeling chilly. His hands and feet became cold. This was followed by a clammy perspiration and a moderately intense facial pallor. At this time the patient complained of frontal headache and palpitation. These symptoms, which lasted about 1½ hours, were treated by external heat and brandy by mouth. Subsequently on four other occasions it became necessary to repeat the administration of epinephrine in oil, and each time the above train of symptoms appeared. The asthmatic symptoms, however for the relief of which the epinephrine in oil was administered, were greatly ameliorated.

CASE 2. D. F., a 38-year-old, obese woman, had had bronchial asthma from ragweed pollen for the previous 12 years.

When first seen the patient was having a severe asthmatic attack. Four tenths of a cubic centimeter of epinephrine hydrochloride was administered subcutaneously followed within ten minutes by an intramuscular injection of epinephrine in oil deep into the deltoid muscle. Within 1 hour marked blanching appeared at the site of the injection. This was replaced slowly by an intense redness, which spread over the shoulder, down the arm and well into the forearm. At the same time, the involved area became markedly edematous and greatly indurated and was very itchy. These symptoms continued for 24 hours and then began to recede. At the end of 6 days the arm had returned to normal. The local reaction was treated with ice packs and cold boric acid compresses. On two other occasions when it became necessary to administer epinephrine in oil the same train of symptoms appeared, the only variation being that the reactions from the second and third injections lasted 7 and 8 days, respectively. Notwithstanding these untoward local manifestations, the asthmatic symptoms were promptly controlled for a prolonged period of time.

SUMMARY

Epinephrine in oil plays an important part in the symptomatic relief of allergic states.

Its administration is not harmless, for complicating symptoms that are transitory can develop following its use.

The infrequency with which these untoward symptoms occur does not preclude the judicious administration of epinephrine in oil.

Two cases are presented in which the use of epinephrine in oil for symptomatic relief of severe asthma was followed by unusual systemic and local symptoms.

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REPORT ON MEDICAL PROGRESS

OPHTHALMOLOGY

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DURING the past year there has been no spectacular progress in ophthalmology. This report deals with a few selected ophthalmological subjects that have attracted attention in recent years. They have been selected on the basis of general interest.

VITAMIN A

The recent clinical and laboratory developments in the field of vitamin A have centered about the eye. Not only are the outstanding clinical manifestations of vitamin A deficiency ocular, but there is considerable evidence that in the normal state the vitamin A molecule is involved in the visual process taking place in the retina.

Ocular disturbances due to vitamin A insufficiency are of two distinct types. The one involves primarily the epithelium of the cornea, conjunctiva and lacrimal apparatus, and its several clinical manifestations are grouped under the heading of xerophthalmia. The other involves the retinal process concerned with vision, particularly in low illumination, and its clinical manifestation, in the form of poor dark adaptability, is called hemeralopia.

Xerophthalmia is the ocular counterpart of the general mucous-membrane disturbance that occurs in vitamin A deficiency.¹ Like the keratinization of the pulmonary bronchioles, which makes the vitamin-A-deficient patient susceptible to pneumonia,² and like the keratinization of the urinary tracts, which gives rise to excessive numbers of epithelial cells in the urine and possibly to renal lithiasis,³⁻⁵ there is keratinization of the corneal and conjunctival epithelium. In the milder forms, xerophthalmia imparts a dry appearance to the eye, and foamy deposits (Bitôt spots) made up of keratinized epithelial cells and saprophytic organisms (*Corynebacterium xerosis*) may appear on the conjunctiva.^{6,7} In the severer form, called keratomalacia, the entire cornea may disintegrate.

Fortunately, xerophthalmia is not common in this country, where the nutrition of the population is good, but it is common in the Far East, and has occurred epidemically abroad at times of limited food supply.^{8,9} Its occurrence in this

country is usually in infants, perhaps owing to greater need for this vitamin during growth.¹⁰

However, several recent observations indicate that the development of xerophthalmia is not dependent solely on vitamin A deficiency. It has been found, for instance,¹¹ that excess of vitamin D causes typical xerophthalmia, even in the presence of normal vitamin A intake. It has been shown experimentally that excess of sodium chloride with a vitamin B deficit in the diet may produce keratomalacia.¹² There is evidence also that damage to the liver by phosphorus may predispose to the development of xerophthalmia.¹³ Calcium deficiency has a similar effect.¹⁴

There appears to be no good evidence that keratoconus in human beings is the result of vitamin A deficiency, although it may occur in animals recovering from xerophthalmia.^{15,16} There is some evidence, based on the experimental work of Heinsius,¹⁷ that corneal abrasions heal more rapidly when vitamin A is used locally on the eye. Kentgens¹⁸ reports finding a low vitamin A content in the serum of patients with various corneal diseases.

The other ocular manifestation of vitamin A deficiency, hemeralopia, is attracting a great deal of interest both in the biological laboratories and in the clinics. It has been known for some time that vitamin A deficiency is characterized by relative inability of the eye to adapt to conditions of low illumination.^{19,20} It has also been shown that the process of dark adaptation is accompanied by, and is probably dependent on, the formation in the retina of a photosensitive substance called visual purple. In the absence of vitamin A the amount of visual purple formed in the retina is subnormal.^{21,22} It has been suggested by Wald²³ that visual purple is, in fact, derived directly from vitamin A. In favor of this is the presence in the retina of large amounts of vitamin A.²⁴⁻²⁶ One must admit, however, that although the chemical formula for vitamin A is known, that for visual purple is as yet unknown.

From the clinical point of view, the fact that vitamin A deficiency is characterized by poor dark adaptation is important, since this function can be measured. The several instruments for measuring it have in common the routine of exposure to a bright light for a known period, and subsequent

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determinations of the light thresholds over a period of at least ten to fifteen minutes.²⁷ It is probably true that the difficulties inherent in the technic are not generally realized.²⁸ Defects in dark adaptation are said to reveal vitamin A deficiency before the patient has any subjective complaint.²⁹ Jeghers³⁰ claims to have shown by this means that subclinical vitamin A deficiency is present in a surprisingly large proportion of students. Jeans³¹ found subclinical hemeralopia in about one fifth of the children entering the pediatric ward in an Iowa City hospital. However, it is by no means certain that the findings with the biophotometer, the instrument used by Jeans and Jeghers, constitute a reliable index of vitamin A adequacy. Not only is the apparatus subject to large errors, but no norm has yet been established with it.³¹⁻³⁴ There are such wide variations of dark adaptation among normal individuals that it is unsafe in the present state of knowledge to diagnose vitamin A deficiency on the basis of this test alone.

Like xerophthalmia, frank hemeralopia in human beings has occurred epidemically when the food supply has been limited.³⁵ It also occurs occasionally with diseases of the liver,³⁶⁻³⁸ owing presumably to failure of conversion of dietary carotene into vitamin A, which normally takes place in this organ. There are a number of other conditions associated with poor dark adaptation which are not known to be dependent on faulty vitamin A metabolism.

Although hypervitaminosis A probably does not occur with the dietary surplus usually taken by human subjects, it is interesting that exophthalmos may be produced in rats with very large doses.³⁹ In these animals there is also concomitant enlargement of the thyroid gland.

OTHER VITAMINS

There is considerable recent literature pertaining to the role of vitamins B₁ and B₂ in ophthalmology,⁴⁰ but one cannot as yet derive any clear cut conclusions as to their significance for the human eye. On the clinical side it has been pointed out that retrobulbar neuritis is occasionally seen with beriberi,⁴¹⁻⁴² and this has led to the therapeutic use of thiamin chloride in all types of retrobulbar neuritis. It is also pointed out that defects in the central visual field are seen with pellagra,⁴³ especially with so-called alcoholic pellagra, and this has given rise to the use of nicotinic acid in alcohol-tobacco amblyopia. The therapeutic results have apparently been successful, but in the absence of other signs and symptoms of vitamin B lack neither the usual retrobulbar neuritis

nor the alcohol-tobacco amblyopia can as yet be classified as a vitamin deficiency.⁴⁴

On the nonclinical side, it is of interest that in many species of animals the retina is especially rich in lactoflavin,⁴⁵ one constituent of the vitamin B₂ complex. Lactoflavin is a photosensitive substance,⁴⁶ and it has been suggested that it may participate in the visual process, specifically in the reception of the short wave lengths of light. If this proves to be true, it may be found that this substance is analogous to visual purple.

Vitamin C is found in extraordinarily large amounts in the intraocular fluid⁴⁷ and in the lens⁴⁸ of the eye. It undoubtedly plays an important part in ocular metabolism. That it is vital to the lens is suggested by the fact that it is found to be markedly decreased when the lens is cataractous⁴⁹ or has been removed.⁴⁷ The therapeutic use of vitamin C to arrest cataract formation, however, has not been successful, and this form of treatment has now been abandoned. The decrease of vitamin C would appear to be secondary to the cataract formation, rather than the cause of it.

Deficiencies in vitamins D and E produce no proved ophthalmic lesions in human beings. It is claimed, however, that vitamin D deficiency and a low-calcium diet will produce keratoconus or an analogous condition in dogs and rats.⁴⁹ The treatment of progressive myopia with vitamin D has been as disappointing as other forms of treatment in this condition.⁵⁰

The effect of vitamin K in the treatment of retinal hemorrhages is being currently studied in various clinics, but no comprehensive report of the results is as yet available.

CONTACT GLASSES

Contact glasses are thin shells of glass which may be placed directly on the eyeball and thereby be made to provide an artificial refractive surface. Their chief purpose is to replace the refraction of a distorted corneal surface, but they may also be used cosmetically as a substitute for ordinary glasses.

The principle of contact glasses is not new. A contact device for replacing the corneal surface was suggested by Thomas Young⁵¹ in 1801. It was the logical outcome of his discovery that many visual errors were due to abnormalities of this surface. The accelerated interest in contact glasses during the last few years is due to certain technical advances in their fitting and manufacture which have made the glasses extensively applicable.

Until recently, contact glasses have been made exclusively of glass. They are now manufactured

in this country from plastic as well.* The glass type, which is still the commonest, is either blown or ground. The blown glass is better tolerated by the eye, but almost always contains some optical imperfections. Perhaps a device having the central optical part ground, or at least molded, and the peripheral part blown will be the happy compromise.⁵² The plastic type of contact glass has not been in use long enough to allow proper evaluation.

The fitting of a contact glass is not easy.⁵³ Strange as it may seem, the portion of the glass that fits over the sclera is more important, so far as the patient's comfort is concerned, than the portion that fits over the cornea.⁵⁴ Unfortunately, it is the scleral part of the eye that is asymmetric and variable with individuals. Hence, many glasses have to be tried before a properly fitting one is found. Inasmuch as stock glasses may therefore offer considerable difficulty, it has been the practice of some clinics during the last few years to make preliminary molds of the eye with dental composition, and to have glasses specially made to fit the molds.⁵⁴ ⁵⁵ Once a glass is properly fitted, it may be worn for a good part of the day without appreciable discomfort.

The indications for contact glasses are limited.⁵⁶ The two outstanding conditions calling for them are keratoconus and irregular astigmatism, in both of which there is a deformation of the cornea that cannot be corrected by ordinary glasses. Another generally admitted indication for contact glasses is high myopia. In this condition contact glasses have definite optical and cosmetic advantages over the ordinary type. There are a host of other possible uses, such as monocular aphakia⁵⁷ or as substitutes for regular glasses during certain athletics in which the danger of injury to the eye is less with the former than with the latter.⁵⁸ The chief disadvantages of contact glasses are their expense and the fact that they cannot be worn for long periods.

Like most other recent advances, that connected with contact glasses has its quota of overenthusiastic advocates. With full appreciation for the value of these glasses, it would seem that there is hardly sufficient basis for advertising claims such as that which appeared in a recent Boston circular: "Eyeglasses in frames are obsolete — use contact lenses."⁵⁹

EXOPHTHALMOS AND THYROID DISEASE

Two new approaches to the problem of exophthalmos with thyroid disease have yielded profitable results. One, which might be called the therapeutic approach, is Naffziger's operation of orbital

decompression for exophthalmos of high degree, the other, coming from the laboratories, is the experimental production in animals of a condition similar to, if not identical with, certain types of exophthalmos in human subjects.

Until recently it has been customary to consider exophthalmos a manifestation of hyperthyroidism, having essentially the same pathogenesis, whatever that may be, in all cases. It has, however, been observed frequently that the degree of exophthalmos is not commensurate with the amount of hyperthyroidism. It has been particularly noted that the severest cases of exophthalmos, the so-called malignant or progressive type, are especially liable to show little or no other evidence of hyperthyroidism, so that the latter alone cannot be held accountable in these cases. It is with progressive exophthalmos that recent progress is concerned.

In 1931 Naffziger devised the operation of orbital decompression for progressive exophthalmos. He at first advocated removing only the roof of the orbit and of the optic canal. More recently he⁶⁰ has advocated the removal of some of the lateral orbital wall as well. Although this is obviously a major procedure, it is generally accepted as the operation of choice when loss of the eyes through exposure is imminent. Progressive exophthalmos is not amenable to the usual treatment of hyperthyroidism. Iodination has no effect, and thyroidectomy often makes the condition worse. Naffziger's operation is therefore the only alternative in many cases. Immediately after it the exophthalmos is worse, but recession of the globe takes place gradually over a period of several months thereafter.

The widespread employment of orbital decompression in progressive exophthalmos has resulted in a fairly large amount of pathologic material becoming available for study. Naffziger and Jones's⁶¹ original findings based on biopsies of the extraocular muscles have been repeatedly confirmed.⁶²⁻⁶⁶ There is a characteristic "proliferation" of round cells, interstitial edema and a Zenker type of degeneration of the muscle fibers.⁶⁷ Naffziger believed that the increase in size of the extraocular muscles is alone responsible for the exophthalmos, but it is not evident that he examined other orbital tissues, and more recent studies by others⁶⁸ indicate that the extraocular muscles are only part of a generalized orbital infiltration.

As regards the other source of information, that from the laboratories, a few years ago it was found that injections of anterior pituitary extract in the young duck caused exophthalmos.⁶⁹ It was then

*Made by Gall and Lembke, 7 East 48th Street, New York City.

ried on guinea pigs and other mammals,^{68, 70-72} with the result that a lasting exophthalmos was usually produced. Preliminary removal of the thyroid gland^{73, 74} favored its development. The fraction of the anterior pituitary gland responsible for the exophthalmos is apparently the thyrotropic hormone. Removal of the thyroid gland increases the amount of thyrotropic hormone in the pituitary gland⁷⁴ and thus enhances the exophthalmos-producing potentialities. The exophthalmos produced by the injection of this hormone is the experimental counterpart of progressive exophthalmos in human beings. The histologic changes in the orbit are the same.⁶⁸ Both experimental and clinical exophthalmos are more apt to develop following thyroidectomy. Hyperthyroidism, far from being essential, appears to be actually inhibitory to this type of exophthalmos, for the latter does not develop until the basal metabolic rate has been lowered to nearly normal or to subnormal levels. The clinical use of iodine and thyroxin in the treatment of this type of exophthalmos has, however, been disappointing,^{75, 76} although in massive doses thyroxin does have a beneficial effect on experimental exophthalmos. *Inasmuch as the doses are near lethal levels, it would be out of the question to use similar amounts in human subjects.*

Other glands of internal secretion may affect the exophthalmos either directly or indirectly through the pituitary gland. Exophthalmos is relatively unusual after the decline of sexual life, and Marne⁷⁷ reports that gonadectomy prevents experimental exophthalmos in rabbits, while injections of the androgens hasten its appearance. The female sex hormones do not appear to have the same exophthalmos-producing properties that the male hormones have.

The most comprehensive recent review of exophthalmos in connection with thyroid disturbances is that of Brain and Turnbull.⁶⁶ These authors differentiate exophthalmic goiter and what they call exophthalmic ophthalmoplegia. The former is Graves's disease, and the latter is what is generally called in this country progressive or malignant exophthalmos. They list the following distinguishing features. Women are affected predominantly in exophthalmic goiter in a ratio of 9:1 whereas in exophthalmic ophthalmoplegia the sexes are about equally affected. The thyrotoxic symptoms and signs other than the exophthalmos are relatively conspicuous in exophthalmic goiter, whereas they are usually slight or absent in exophthalmic ophthalmoplegia. Indeed in the latter condition there may be hypothyroidism. The usual initial symptom in exophthalmic goiter is nervousness, loss of weight or tremor, whereas the first and frequently the only complaint in exophthalmic ophthalmoplegia is the exophthalmos.

Patients with exophthalmic goiter are benefited by iodine and thyroidectomy, while those with exophthalmic ophthalmoplegia show no improvement with iodine and are frequently made worse by thyroidectomy. The response to treatment on the one hand and lack of response on the other may also differentiate the myopathy that occurs in the two conditions. The amount of exophthalmos is greater in exophthalmic ophthalmoplegia, being on an average 7.0 mm., in comparison with 2.5 mm. in exophthalmic goiter. The rate at which the exophthalmos develops is also more rapid in exophthalmic ophthalmoplegia. For the cause in the latter condition Brain and Turnbull accept the thyrotropic hormone theory.

While considerable progress has thus been made in understanding the cases that develop exophthalmos with little other evidence of hyperthyroidism, the mechanism of exophthalmos in Graves's disease is still a mystery. A recent editorial⁷⁸ in the *Journal of the American Medical Association* probably represents a majority opinion by unqualifiedly accepting the explanation that the exophthalmos results from sympathetic stimulation. The basis for this belief is of course the fact that exophthalmos may be produced in animals by stimulating the cervical sympathetic chain.⁷⁹⁻⁸⁰ But this has not been found to be the case in human beings, and Whitnall⁸¹ denies that there is sufficient smooth muscle in the human orbit to have any appreciable effect. Furthermore, the pupil, which is ordinarily the most sensitive indicator of sympathetic activity,⁸² shows no evidence of stimulation in Graves's disease.⁸³ Nor has sympathetomy had any beneficial effect on the exophthalmos.⁸⁴ It would seem wise, therefore, to reserve judgment as to the cause of exophthalmos in Graves's disease until more evidence is available. Fortunately it does not present the clinical problem that progressive exophthalmos does, as it usually yields to adequate therapy of the hyperthyroidism.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTHEMORTUM AND POSTMORTUM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26171

PRESENTATION OF CASE

A twenty-three year-old man was admitted to the hospital complaining of intermittent cough and hemoptysis.

The patient had been well until six and a half years before admission, when he began coughing while eating sugar-coated cookies. He raised about a teaspoonful of mucoid sputum which "contained blood." Following this he noted a tickling sensation in the throat for several days, although he did not cough. A few months later he developed a severe cough, with sputum and fever that lasted about ten days. A similar attack occurred one month later, but there was no hemoptysis at either time.

About five years before entry similar symptoms reappeared, with the production of moderate amounts of yellowish mucoid sputum. He had "pleurisy" on the left side and was admitted to an outside hospital, where roentgenograms of the chest showed "some density in the left upper lobe." Bronchoscopy was performed, and following this the patient raised copious amounts of yellow, mucoid, odorless sputum for several days. Then the cough and sputum subsided. He was well and entirely symptom free for the next one and a half years. He steadily gained weight and led a normal vigorous life, except for the fact that throughout this interval he was subjected to repeated diagnostic bronchoscopies at least once every two months.

Four months before admission he again developed fever and a cough with the raising of yellow, mucoid sputum, for which he was readmitted to the same hospital. Repeated therapeutic bronchoscopies were of little aid, however, and calcium and atropine tablets relieved his symptoms. He was discharged from the hospital without a definite diagnosis. The repeated bronchoscopies were continued about once every four months for the next two years. He felt well, working as a salesman and later as a golf professional. Two years before admission he noticed that he tired easily and that he was losing weight. Artificial pneumothorax was tried as a therapeutic procedure. He then felt much improved, but about two months after

ward again had a typical attack of fever and cough, with the production of yellow, mucoid sputum.

X ray films of the chest showed fluid at the left base." He was ill ten days and following this was well for months, although the bronchoscopies were regularly repeated and the pneumothorax was continued by refills. One and a quarter years before admission he awoke one morning and coughed up a mouthful of pure, bright red blood. The sputum was blood streaked for several days thereafter, but he felt well until one year before entry when an identical attack of hemoptysis occurred, followed by a "streptococcal sore throat" lasting two weeks. He had a temperature of 103°F, he was nauseated and vomited frequently, and the productive cough recurred. He sometimes raised as much as two cupfuls of yellowish sputum daily. He was hospitalized for seven weeks. Since that time he had never been free of symptoms, the cough with sputum persisting until the present admission, although it was sometimes relieved by dependent drainage. He continued to have pneumothorax refills until six months before entry, although without much relief.

Three months before admission he again coughed up a mouthful of bright-red blood. For three weeks thereafter the sputum was blood streaked. Since then he had had six similar attacks, the last occurring four days before entry. During the year preceding entry the patient experienced a slow but steadily increasing dyspnea on exertion. He lost no weight, although he failed to gain. Throughout the course of the six year sickness, bronchoscopy was performed sixty five times. All specimens removed at biopsy were negative. The family and past histories were negative. He entered this hospital for surgical treatment.

Physical examination revealed a fairly well developed and rather poorly nourished man who lay in bed in no acute distress. He coughed at irregular intervals, raising thick, yellowish mucopurulent, odorless sputum. The right chest was definitely larger and more expansile than was the left. Tactile fremitus was diminished, and almost the entire left chest was dull to flat. Over the same area the breath sounds, vocal fremitus and whispered voice sounds were diminished to absent. No wheeze or rales were noted. There was obvious clubbing of the fingers. The heart was negative; the blood pressure was 138 systolic, 80 diastolic. The remainder of the physical examination was negative.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red-cell count of 3,700,000 with 80 per cent hemoglobin, and a white-cell count of 13,200 with 87 per cent poly

morphonuclears The urine was negative The sputum was mucopurulent, contained cocci in chains, but no spirochetes or acid-fast bacilli A sputum culture showed a moderate growth of beta-hemolytic streptococci The basal metabolism was +5 per cent A glucose tolerance test and the serum calcium, phosphorus and phosphatase levels were all normal

Roentgenograms of the chest showed consolidation involving the left upper lobe as well as the anterior portion of the left lower lobe, with multiple cavity formation in the same areas The heart was slightly displaced to the left and showed an inspiratory shift to the left The right half of the diaphragm showed normal motion, the left was not clearly visible The right lung showed no significant abnormalities Films of the hands showed an increase of soft tissues, there was no evidence of periosteal new-bone formation

The patient remained in the hospital under observation for ten days On the eleventh day an operation was performed

DIFFERENTIAL DIAGNOSIS

DR FREDERICK T LORD May we see the x-ray films?

DR AUBREY O HAMPTON The right lung is normal There are cavities from the apex to the diaphragm on the left side, most of them are apparently in the upper lobe and contain fluid levels The pleura is thickened over the entire left side, and the left side of the diaphragm is two interspaces higher than normal The mediastinum has shifted a little to the left in the upper portion, and a little to the right in the lower portion

DR LORD Is there anything unusual about the bronchi?

DR HAMPTON I do not see a localized area of fibrosed lung such as you see in chronic bronchiectasis, but there are so many lesions in the lung that it might be obscured Here there is a suggestion of a localized patch of dilated bronchi in the middle of the left lower lobe

DR LORD We have a twenty-three-year-old man with six and a half years' disturbance of a respiratory nature, which was at first intermittent and during the past year continuous For the first four or five years he had complete freedom between the attacks of cough, fever and sputum During the past year he expectorated a large amount of odorless, purulent sputum, and had shortness of breath and moderate hemoptysis

The physical signs—dullness to flatness, with diminished breath sounds, tactile fremitus and whispered voice sounds—are very suggestive of bronchial obstruction However, they are not distinctive of it, so that one cannot draw the con-

clusion that he had bronchial obstruction from the signs alone Similar signs are found in other conditions tumor would produce the same signs, as would multiple cysts not communicating with the bronchi He had a moderate secondary anemia

I should like to know more about the sputum, the record gives little of significance One of the more interesting parts of this story is the large number of bronchoscopic examinations, and I must say that a striking feature about them is that while the record mentions them many times, it says nothing about the findings

DR RALPH ADAMS He was bronchoscoped in an effort to make a diagnosis

DR LORD In an outside hospital?

DR ADAMS Yes, in fact by an expert bronchoscopist of whose competence there can be no doubt When he came to Boston the diagnosis remained unestablished

DR LORD From the bronchoscopic point of view?

DR ADAMS Yes

DR LORD That does not help much

Of course, x-ray study is of great importance in trying to unravel the situation I should like to know what the x-ray film taken five years ago showed

DR ADAMS It showed an increased density on the left side of the chest

DR LORD That is what the record says With so many pathologic changes now, it might help to unravel the problem if we knew what he had five years ago

DR ADAMS They suspected cancer

DR LORD It would be desirable to know more about the sputum Perhaps it is fair to assume that other examinations were made Tuberculin tests, if necessary up to and including 1 mg of tuberculin, would be desirable, and also a search of the sputum many times for tubercle bacilli and such other investigations as concentration and culture of the sputum and examination of the gastric contents for tubercle bacilli

DR BENJAMIN CASTLEMAN All that had been done prior to entry, but nothing was found

DR LORD According to the x-ray film there is no special suggestion of tuberculosis in the upper part of the chest there is no finely or coarsely mottled increase of density above the anterior portion of the third rib extending out to the periphery The use of Lipiodol is an investigation to be considered under these circumstances, but it is questionable as to whether we should get any valuable information out of it

To come to a conclusion with respect to this problem, I make the diagnosis of chronic pulmo-

nary suppuration with confidence, but I am not so sanguine about unraveling the cause.

I am inclined to exclude tuberculosis. Dermoid cyst seems highly improbable with such a diffuse process.

Bronchial obstruction cannot be excluded but with the lack of detailed information regarding the bronchoscopic findings it cannot be concluded that he had bronchial obstruction. There is the possibility that at the time he coughed while eating cookies, he inhaled a foreign body with consequent bronchial occlusion and infection beyond the obstruction. A bronchial tumor is another possibility, but with the bronchoscope in competent hands, it is difficult to understand how a tumor in accessible bronchus could be missed. A tumor in the lung itself, invisible by bronchoscopy, is a possibility. Such a tumor would be likely to be of a benign type, as evidenced by the duration of the illness and his good general condition at the time of entry. I have to leave the question of bronchial obstruction without reaching any definite conclusion.

There is evidence of multiple cavities containing purulent material. Owing to the absence of foul sputum, they are unlike the commonest type of lung abscess, and they may have been caused by bronchial obstruction and consequent infection with resulting abscesses, induration and bronchiectasis.

There is another possibility that cannot be excluded, namely congenital cystic disease, which is probably commoner than we have appreciated.

I shall have to make a diagnosis of chronic bronchopulmonary suppuration of undetermined origin, but with such underlying factors as I have suggested as possible causes.

DR. CASTLEMAN: Dr. Churchill, do you remember what your preoperative diagnosis was?

DR. EDWARD D. CHURCHILL: It was bronchial obstruction due to inflammatory stricture or benign tumor. The bronchoscopist who had performed the innumerable bronchoscopies always said that there was a tumor there although he could not reach it.

DR. LORD: Or see it?

DR. CHURCHILL: He saw only a blind ending of the upper lobe bronchus on that side.

The operation was a total pneumonectomy. We knew we had to find some solution for these recurrent life-endangering episodes of infection. His physician was very anxious about the delay that was necessary to get him on the waiting list, because he was so afraid that the young man would have another very serious episode of infection.

At operation the primary lesion was not evident

at first, not until the operation was nearly completed. The apex was adherent, so much so that in dissecting it out the question was raised in my own mind whether we were dealing with bronchial stricture of tuberculous origin, but when I finally had mobilized the lung and reached the hilar region I could feel a round tumor and hence carried the amputation of the lung to a level proximal to the tumor.

CLINICAL DIAGNOSIS

Bronchial obstruction due to inflammatory stricture or benign tumor

DR. LORD'S DIAGNOSIS

Chronic bronchopulmonary suppuration of undetermined origin

ANATOMICAL DIAGNOSES

Bronchial adenoma

Bronchiectasis.

Chronic pneumonitis.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: The hilar mass that Dr. Churchill was able to feel at operation was a hard nodular tumor about 2.5 cm. in diameter, which at first glance appeared entirely extrinsic to the main left upper lobe bronchus but fairly adherent to it. Further examination disclosed that this tumor was an extension of a small intrabronchial non-occluding lesion. In other words, the larger extrinsic portion of the tumor had produced by pressure the bronchial obstruction that had prevented the bronchoscopist from seeing or biopsying the lesion. The cut surface of the lung showed that the upper lobe was completely atelectatic and composed of distended bronchial cavities with a superimposed chronic pneumonitis. The tumor had produced obstruction to one of the bronchi to the lower lobe, and the portion of the lung supplied by this bronchus was similarly involved.

Histologically the tumor is a so-called "adenoma," being composed of small round cells usually arranged in pseudo-acinar formation, definitely invasive locally, and in our experience not malignant. Out of about 20 cases that we have seen only one showed a metastasis to a regional lymph node. Although they are very similar microscopically to the carcinoids of the small intestine, we have never been able to prove that they are argentaffin. In spite of these negative findings Hamperl¹ still believes that they belong in the same group with the carcinoids, although Womack and Graham,² of St. Louis, contend that they fit in with their classification of mixed tumors of the lung.

DR. ADAMS The bronchoscopist's observations throughout the repeated bronchoscopies had been correct, although he could not arrive at a diagnosis. He would look down and see occlusion of the bronchus, and take a biopsy of the hard mass, only to get a report of bronchial mucosa. The bronchial obstruction visible by bronchoscopy was caused by extrinsic pressure from tumor that had grown downward into the hilus, from its origin in a peripheral bronchus.

DR. CHURCHILL The importance of this tumor at the moment lies in the confusion that exists between it and true bronchiogenic carcinoma. In our series of bronchiogenic tumors the ratio of incidence of benign adenoma to microscopically proved carcinoma is 1:10. If we include cases of cancer of the lung not proved microscopically the ratio is approximately 1:20. However, if we begin to talk about the results of operative treatment and narrow our discussion to resectable bronchiogenic tumors then the ratio becomes 1:4. In other words, of resectable bronchiogenic tumors we find 25 per cent are benign adenomas and 75 per cent true bronchiogenic cancers. One can readily shift the results in cancer of the lung toward the optimistic side by including these tumors. This pitfall has already been recognized. The cancer of the lung cured by bronchoscopic removal that was referred to many years ago by Jackson has been reviewed by C. L. Jackson,³ his son, and interpreted as having been a bronchial adenoma. The series of cases treated by Manges,^{4, 5} of Philadelphia, with radiation treatment, with which he got surprisingly good results, has been gone over and the good results are all interpreted as having occurred in cases with bronchial adenoma.

In passing, we might note that the young man survived the operation and should remain well without danger of recurrence or metastasis.

DR. DONALD KING It might be of interest to report our experience to date with benign adenomas. We have now observed a total of 21 cases, 11 in males and 10 in females. Of the males, 2 were over fifty years of age, 5 were in the thirties, 1 was twenty-two, and 3 were under twenty; of the females, 2 were over sixty, 4 were in the thirties, 2 were in the twenties, 1 was eighteen, and 1 was six. Of the total number, 7 are dead and 14 living. Of the dead, 1 was treated by bronchoscopy alone, 1 by bronchoscopy and radium seeds and 1 by bronchoscopies, radium and x-ray; 2 died after lobectomy, and 2 were discovered only at post-mortem examination. Of the 14 living, 5 had bronchoscopic removal of the tumor with no other treatment, 1 had radium seeds implanted, 3 had pneumonectomy, 4 had lobectomy, and in 1 the

adenoma was removed through the trachea. At the present time it seems reasonable in most cases to remove as much of the tumor as possible through the bronchoscope, but it is probable that the majority of the cases will have to have lobectomy later if the pulmonary condition is to be cured.

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CASE 26172

PRESENTATION OF CASE

First Admission A sixty-six-year-old mason was admitted to the hospital complaining of an "infected corn" of about seven days' duration.

The patient was treated conservatively with moist boric applications to the foot lesion. Diabetes was discovered and he was placed on a diabetic diet with small doses of insulin. He improved steadily, the urine became sugar-free, and he was discharged to be followed in the diabetic outpatient clinic.

Final Admission (four years later) He entered the hospital because of the onset of low abdominal pain seven hours previously. About seven years before this admission the patient first noticed the onset of recurrent attacks of abdominal pain. Characteristically, without known cause or relation to food, there was a gradual onset of mild epigastric pain, which became maximal in an hour and was described as a sharp, severe, colicky distress which radiated to the left lower quadrant of the abdomen. Occasionally the pain passed from "side to side." When they occurred he was usually constipated and was subject to attacks of belching, but he passed no flatus by rectum. He was able to obtain relief from the pain by constipation and belching by either taking Epsom salts or enemas, or both. These episodes usually occurred at about bi-weekly intervals, and on rare occasions were so severe that hypodermic medication was required for the relief from pain. Three years before admission he was studied in an outside hospital where the examination, including repeated x-ray studies and a gastrointestinal series was reported as negative.

The attacks continued, and three months before entry he lost his former vigor, became weak and had to stop work. He became constipated, had frequent attacks of pain, each lasting six to seven

hours, and on a few occasions vomited "black bile," with little relief. He volunteered the information that so long as his bowels were "open" he had no discomfort. He became obstipated for several days one month before admission. Two days prior to and on the day of admission he suffered severe attacks of abdominal pain, each lasting two to four hours and leaving him with a generalized abdominal soreness. Hypodermic medication gave relief from the pain of the last attack, but six enemas attempted on the afternoon of admission were without results. He had taken no insulin prior to entry.

Physical examination revealed a sick man whose abdomen was distended, tympanitic and diffusely tender, there was slight spasm in both lower quadrants. By rectal examination there was equal tenderness bilaterally, but no masses or other abnormalities were noted. The blood pressure was 190 systolic, 70 diastolic, and the pulse was very irregular.

The temperature was 99.8°F, the pulse 94, and the respirations 20.

Examination of the blood showed a red-cell count of 3,860,000 with 65 per cent hemoglobin (Tallqvist), and a white-cell count of 5100 with 36 per cent adult polymorphonuclears, 56 per cent young polymorphonuclears and 8 per cent lymphocytes. Three days later the white-cell count was 11,100 with 96 per cent polymorphonuclears, the majority of which were young forms. The urine was negative save for a very slight trace of albumin and an olive-green sugar test. The blood nonprotein nitrogen was 55 mg per 100 cc., the chlorides equivalent to 90.5 cc. of N/10 sodium chloride, the protein 5.2 gm., the van den Bergh test normal, indirect, and the sugar 187 mg. An electrocardiogram showed auricular fibrillation, with a ventricular rate of 150, but no definite evidence of any other abnormality.

Röntgenograms of the abdomen in the supine position showed no unusual amount of gas in the bowel. A film in the upright position showed several horizontal levels with small air bubbles in the mid-abdomen. In the region of the cecum and ascending colon there was a soft-tissue mass, but it was not ascertainable whether it was the cecum filled with fecal material or a shadow of intussuscepted bowel.

The patient's temperature rose steadily, and he was obviously becoming increasingly sicker. A Miller Abbott tube was passed, but its tip failed to enter the pylorus. Urinary sugar tests after the admission specimen were negative, and there was no diacetic acid or acetone.

He was transfused, given digitalis and treated

conservatively. He quickly failed and died on the fifth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. EDWARD HAMILIN, JR. May we see the x-ray films?

DR. GEORGE W. HOLMES The gas that we see is almost wholly in the large bowel. There is a small collection here which might be in the ileum or lower small bowel. If this is small bowel, I should not call it dilated. So far as the film is concerned, we have no help whatever, except to say that there is no evidence of distended small bowel. The film taken with the patient standing shows these levels of fluid and gas. The patient had had several enemas, however, so that he may have had fluid in the large bowel, a possibility which makes this observation of no particular value. If we are going to be asked to determine the presence of abdominal fluid levels in the small bowel we should have a patient who has not had an enema just before examination.

DR. HAMILIN There is no evidence of free intraperitoneal fluid?

DR. HOLMES No, but the x-ray films do not all ways show it.

DR. HAMILIN We have a seventy-year-old man, who was apparently a mild diabetic, with a seven-year story of what sounds like intestinal obstruction. The first thing to ascertain is whether it is obstruction of the small or large bowel. The location of the pain in the mid-epigastrium is evidence of small-bowel obstruction, but because of the facts that the pain radiated to the left lower quadrant and that the attacks were always concurrent with obstipation and apparently relieved by enemas and Epsom salts—a curious way of relieving intestinal obstruction—I prefer to think that his difficulties were due to large-bowel obstruction. The attacks became worse, and he eventually entered the hospital in a very severe attack. We are not told the type of pain, the record merely states that it was abdominal pain.

The physical examination tells us nothing about whether he was cachectic but it does give us evidence of a diffusely tender abdomen, with slight spasm in the lower quadrant and tenderness by rectum.

The laboratory helps only by showing that there was obviously an attempt by the leukocytes to react to an infection of some sort. The elevated blood nonprotein nitrogen would go with either intestinal obstruction or peritonitis. Low blood chlorides usually indicate vomiting, but we have not been told that there had been vomiting in the immediate illness. I should like to know

whether the stool examination showed blood, but presumably with the enemas there was nothing on which to determine that

So we come down to the diagnosis of large-bowel obstruction of long duration, which I believe had perforated. The causes of perforation in such a large-bowel lesion may be several: an intermittent volvulus, a chronic intussusception, as was suggested by the x-ray interpretation, a diverticulitis, or possibly, if we can eliminate some of the old story, a carcinoma of the large bowel. The story is entirely consistent with diverticulitis, in fact it is almost a textbook picture, with the exception that increased flatus is usually described.

It is possible that the auricular fibrillation had led to the throwing off of an embolus and the subsequent development of mesenteric thrombosis, but if we include the entire story that does not seem likely. So with nothing more to go on, I make my first choice, diverticulitis of the cecum, with perforation and peritonitis.

DR TRACY B MALLORY: Would anyone care to offer another diagnosis? Dr Hamlin's diagnosis agreed with the discharge diagnosis on the ward.

DR WYMAN RICHARDSON: I suggest a diagnosis of large-bowel obstruction, probably due to carcinoma of the large bowel.

CLINICAL DIAGNOSES

Generalized peritonitis
Diverticulitis, acute
Arteriosclerosis, generalized
Diabetes, mild

DR HAMLIN'S DIAGNOSES

Diverticulitis, acute, with perforation
Generalized peritonitis

ANATOMICAL DIAGNOSES

Obstruction of ileum from adhesive band (? congenital)
Perforation of ileum
General peritonitis
Meckel's diverticulum
Hypertrophy of prostate, benign, lateral lobe, slight
Trabeculation of bladder, slight
Nephritis, chronic vascular, slight
Arteriosclerosis, coronary arteries and aorta, slight
Pulmonary atelectasis

PATHOLOGICAL DISCUSSION

DR MALLORY: This was a very blind case, and in retrospect the only possible lead was the original localization of the pain, the lesion was in the small bowel and not the large. It was of rather unusual character. He obviously had had chronic obstruction of the lower ileum for many years due to a very dense fibrous adhesive band, which was not accounted for by any previous operation. So the question arises as to whether this band was congenital in origin. The other finding was an entirely unsuspected Meckel's diverticulum, which lay 30 cm above the adhesive band and had nothing to do with it. However, just above the adhesion was a small perforation of the ileum, about 1 cm in diameter, from which general peritonitis had resulted. It was, apparently, a spontaneous rupture immediately behind the point of obstruction. There was no neoplasm.

A PHYSICIAN: You might well have expected some free gas in the abdomen.

DR ARTHUR W ALLEN: The films were probably taken before perforation occurred.

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PROGRESS IN CANCER CONTROL

SINCE April has been dedicated as Cancer Month, it is appropriate that the Division of Adult Hygiene of the Massachusetts Department of Public Health,* which is charged with the cancer control work in this state, should report on its activities and accomplishments during 1939.

Again, Massachusetts has the proud distinction of being the only state in the Union, indeed the only place in the world, which had a falling cancer death rate in women. There was also a slight drop in the rate for men.

The attendance of cancer patients at the cancer clinics has increased from an average of 758 per year prior to 1935 to 1676 in 1939. Of the latter patients, 22.4 per cent went to their physicians within a month of the first symptoms of the disease. This

is an all-time record for early diagnosis of cases of cancer.

The interest of physicians in the cancer clinics is shown by the facts that 85 per cent of the patients coming to the clinics were referred by physicians, that the clinics are voluntarily staffed by physicians in the local communities and that the annual attendance of physicians at consultation and teaching clinics has increased from an average of 229 for the first years of the program to 1364 in 1939.

An increase has also been noted in the utilization of the Tumor Diagnosis Service, maintained jointly by the Massachusetts Department of Public Health and the Harvard Cancer Committee for the use of those physicians without adequate laboratory facilities for the histological diagnosis of cancer. The average number of specimens received for diagnosis from 1927 to 1935 was 2813 annually. In 1939, 3620 were received, and the number of surgeons using the Tumor Diagnosis Service increased from an average of 421 to 738.

The Massachusetts Medical Society may well congratulate itself on the work that it has done in furthering the diagnosis and treatment of cancer. But it must not regard its responsibility as in any way lessened, but rather heightened, by the fact that apparently this particular enemy of mankind is in grudging retreat.

ARMY EXPERIENCE FOR PHYSICIANS

AN announcement, published elsewhere in this issue of the *Journal*, indicates the intention of the War Department to offer one year of active duty with the United States Army to civilian physicians under thirty five years of age who will accept appointment in the Medical Corps Reserve in order to permit them to be placed on such duty.

This announcement is, in effect, an invitation to the medical profession to contribute its share in time of peace toward the organization of national defense. Congress has provided for augmentation of the strength of the Army, both in the regular establishment and in the National Guard. Peacetime maneuvers on an unprecedented scale are authorized and planned for the spring and

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summer of this year Reserve officers are being called to active duty for specified periods of time in order to expedite augmentation in an orderly fashion and to provide commissioned personnel for the maneuvers to be held

The compelling logic underlying these plans, in the unsettled state of the world at present, can scarcely be questioned. The proposal to offer reserve commissions to young qualified physicians is intelligent and timely, since the Army not only may attract some of them into the regular service but also will train the majority to perfect themselves for the possible, if fervently undesired, day when wartime mobilization takes the place of peacetime maneuvers.

The announcement should offer a distinct appeal to many recent graduates in medicine who have either finished or are about to finish their training as interns. The year of service, if accepted, is essentially a postgraduate internship in military medicine with rates of pay and allowances set at assured and attractive levels. An unequalled opportunity is presented to learn the duties of the physician as an officer, duties which become more specialized in the military sense as new tactics and technics are adopted by the combat branches. He who secures active service for a year under the conditions offered can be well satisfied that he is not only discharging a fundamental civic duty but is also preparing himself to play an essential part in the event of disaster afflicting this nation as it has already afflicted so many other peaceful ones.

MEDICAL EPONYM

BOWMAN'S CAPSULE

William Bowman (1816-1892), assistant surgeon to the King's College Hospital and demonstrator of anatomy in King's College, London, read before the Royal Society on February 17, 1842, a paper "On the Structure and Use of the Malpighian Bodies of the Kidney, with Observations on the Circulation through that Gland." This was printed in the *Philosophical Transactions of the Royal Society of London* (132: 57-80, 1842).

The Malpighian bodies I saw to be a rounded mass of minute vessels invested by a cyst or capsule* of precisely similar appearance to the basement mem-

brane of the tubes. Seeing these similar tissues in such close proximity, it was not easy to resist the conviction that the capsule was the basement membrane of the tubes expanded over the vessels. Having, during last summer, been made acquainted, through the kindness of Dr. Milne Edwards, with a new method of injection employed with great success by M. Doyère of Paris,** I injected some kidneys through the artery, by this method, in order to notice the nature of the vascular ramifications in the Malpighian bodies. I not only found what I sought, but the clearest evidence that the capsule which invests them is, in truth, the basement membrane of the uriniferous tube expanded over the tuft of vessels.

*First particularly pointed out by Muller who conceives it to be perfectly closed except at one point where perforated by the vessels.

**This consists of two fluids which mingle in the small vessels, and cause a precipitation there. The best fluids are saturated solutions of bichromate of potash and of acetate of lead. They are injected in succession through the same vessel whence the method is termed that by double injection. Krause published an account of it two years ago but M. Doyère appears to have arrived at it after a laborious trial of numerous solutions. Both deserve the thanks of anatomists for so valuable an addition to the means of investigation.

R W B

OBITUARY

LEROI GODDARD CRANDON

1873-1939

On December 27, 1939, Doctor LeROI G. Crandon died after a long and slowly progressive, but happily painless, illness. To very many of us who called him "friend," the occasion of his death would seem to call for some comment, however brief, in the columns of the *Journal*. We are not sure that he would have desired any such comment.

His educational equipment was of the best, both by inheritance and acquisition. His father, a strikingly handsome, lovable and courteous gentleman, was originally a minister of the Unitarian Church but later became associated with the Society for Ethical Culture. He was an ardent and discriminating collector of books, a trait strongly inherited by his son. His mother and sisters also supplied a sturdy New England background of intellectuality and clear thinking. Doctor Crandon received his A.B. *cum laude* from Harvard University in 1894 and his M.D. *cum laude* in 1898. Many years later (1909) and while carrying on a very large and insistent practice, he worked for and received his A.M. in philosophy from Harvard University. How he ever found time to do the hard work and intensive reading required for this particular degree, all the while engaging in a practice that carried on night and day, almost beggars understanding. His endurance seemed endless. Working tirelessly throughout the day

and evening (and often into the night) on public and private hospital patients, he not infrequently studied until two or three o'clock in the morning. It is doubtful if he ever averaged more than five or six hours sleep during this period. And yet through it all he maintained a serenity of manner and an unusual quietness of speech, not always properly appraised by some of his colleagues.

Receiving an appointment in surgery at the Boston City Hospital in 1898, he made a brilliant record as a house officer, and in 1903 became a member of the Visiting Surgical Staff, holding that position until 1919, when he resigned. As a surgeon he was conservative, sure of his technique, meticulous as to details, never spectacular and possessed of excellent surgical judgment. Fortunately were those house officers who had their training under him, and doubly fortunate the patients who came under his direct professional care. He was a master of postoperative care, and his book, *Surgical Aftercare* embodied all the principles he practiced and taught, the book went through two editions, was adopted by the United States Army and went through several translations into foreign languages. He taught surgery for many years at the Harvard Medical School, both clinical and laboratory, the latter consisted of operative surgery on the cadaver and was conducted in conjunction with the late Dr. George H. Monks. His surgical papers were many and valuable, especially those dealing with diseases of the prostate, appendicitis, fractures of the base of the skull, and difficulties with the feet due to improper shoes. His style was direct and forceful with well-chosen words and phrases. His expressed ideal in these respects was the late Dr. David W. Cheever, whose scholarly lectures on surgery—later printed in book form but unfortunately not now readily available—were his model.

During the World War he served in the Navy at New London, Connecticut, organizing United States Naval Hospital, No. 9, a thousand-bed plant. His excellent service was recognized, and he shortly was promoted to the rank of lieutenant commander. He was later given the rank of commander.

Of avocations Doctor Crandon had few. He was a great lover of books, and his collection on Arctic exploration was outstanding in character and number of volumes. Over a long period, yachting was an engrossing pastime with him. An able navigator, he possessed in the course of years two fine schooners, the *Nokomis* and the *Black*

Hawk both of which he himself sailed. For a time he was commodore of the Boston Yacht Club.

No sketch of the life of Doctor Crandon would be complete without some reference to what became to him in his later years a matter of most intense devotion. In 1923 he became absorbingly concerned with psychic research. This interest was stimulated and made possible by the mediumship of his wife, Mina Stinson Crandon ("Margery"), and lasted until his failing health called a halt. He became an active member of American and British societies for psychical research, his interest being, as he himself said, purely objective and scientific. He made several trips to England for discussion of scientific matters bearing on psychic phenomena with Sir Conan Doyle and Sir Oliver Lodge, and in turn was visited very many times in his home on Lime Street by scientific investigators from this country and abroad. As one of Doctor Crandon's closest friends says of him, "Brilliant as was his surgical career, it is probable that he will be remembered more especially for his connection with psychic research." To the end, he was the scientific observer of these psychic phenomena. Mediumship has always been a controversial and bloody battleground, and that of "Margery" was no exception. Doctor Crandon believed absolutely and unwaveringly in the integrity of the mediumship of his wife. So believing, he fought valiantly, asking and giving no quarter, and regardless of the number or the character or the fame of the opposition. As is well known, they left nothing undone to discredit him. Knowing the man as some of us did, one can be certain that he would have been the first to demolish the whole structure and admit its fallacies if he had believed for one moment that the observed psychical phenomena were unsound or explainable by purely natural methods.

To a host of patients, Doctor Crandon, because of his unremitting devotion, kindness and skill, was the ideal and beloved physician. To a very great number of doctors to whom he was always an unfailing friend, able counsellor and skillful surgeon, he was a never failing help, and their devotion and loyalty to him were as great as the regard of his patients. A remarkable tribute to the real affection and respect which so many people of all walks of life held for him was shown in the outpouring of the friends who attended the funeral service. All felt a deep and heartfelt grief at the loss of a friend.

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AND GYNECOLOGY

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Beginning on September 28, 1939, and running through April 18, 1940, cases dealing with the treatment of uterine sepsis were presented in the *Journal*. An attempt was made to show the change from unintelligent to intelligent treatment—from invasion of the uterus and symptomatic treatment to that based on non-interference with the uterus and a knowledge of the specific infectious agent. The policy of letting the uterus alone evolved from the observation of the dire results that frequently followed its invasion. It is surprising that it took the profession so long to conclude that puerperal infections should be attacked from the etiologic point of view, but this was undoubtedly stimulated by the recent successful treatment with chemicals of other diseases of known bacterial etiology. Today the treatment of such infections is intelligent. The uterus is looked on only as the portal of entry of the infection, and is never itself invaded except for hemorrhage. The disease is attacked, as are nearly all other infections, by attempts, with stained smears and cultures, to determine the bacterial invader, and the method of treatment depends on this specific knowledge. In this respect the treatment of puerperal sepsis has at last been placed on a solid foundation, and the results are very gratifying. The few cases of cesarean section that were reported illustrate that subsequent sepsis without peritonitis should be treated in the same way as sepsis following pelvic delivery.

In the subsequent issues of the *Journal* a series of cases of pyelitis during pregnancy will be presented. The first ones will be those treated twenty-five years ago, when treatment was entirely symptomatic. These will be followed by cases in which kidney lavage played an important therapeutic role. Lastly will be the recent cases in which lavage and chemotherapy have been used with excellent results.

THE MASSACHUSETTS CANCER PROGRAM*

The Massachusetts Cancer Program has just completed its thirteenth year of operation. The results of this long-continued attack on cancer are being realized. During the past year the outstanding accomplishments were a continuation of the shorter period of delay between first

recognizable symptoms and visit to physician first noted in 1936, a larger percentage of individuals going to their physicians in the first month of the disease, a far greater use of the Tumor Diagnosis Service, more individuals coming to the clinics than ever before, sixty three teaching clinics attended by 1364 physicians, an extension of the Co-operative Cancer Control Committees, and the opening of two new cancer clinics.

Question During the past few weeks I have heard a large number of physicians ask if the fall in the cancer death rate among women is continuing. This seems to be the most important question in the minds of those interested in cancer. Will you discuss this?

Dr. Lombard The 1939 adjusted cancer death rate for women again showed a decline over the previous years. This decline from the all time high in 1925 of 1300 per 100,000 population is now approximately 4 per cent. This may not seem large, but it represents a saving of several hundred lives, and if the decline continues in the years to come, many more lives will be saved.

Question The question of delay is another of great importance. In the cancer clinic population there are three types of delay—that before the visit to the first physician, that between this period and attendance at a clinic and that between attendance at the clinic and treatment. In the ordinary hospital population there are only two types of delay—that before the visit to the first physician and that between the visit to a physician and the institution of treatment. The summation of all delays depicts the time wasted between first symptoms and treatment. Will you differentiate these delays and discuss their significance?

Dr. Lombard The interval between first symptoms and the visit to first physician represents a delay on the part of the public. In the early part of the program this delay was nearly seven months. In the last few years it has been decreasing, and in 1939 it was only five months. This, of course, is too long, but it shows that the educational efforts being expended by the Massachusetts Department of Public Health and co-operated in by some 15,000 organizations in the State are having results. The second delay, that between the visit to a physician and attendance at a clinic, was only about one third as long last year as in the early days of the clinic. The third delay, that between attendance at a clinic and treatment, is very short due to the excellent work of the social service departments. While the total delay in Massachusetts clinics averages some nine months, it is much shorter than that reported from other states, and it is also shorter than that reported from Massachusetts hospitals. Apparently the reason for this is the shortening of the interval of delay between visiting a physician and treatment brought about by social service workers in the clinic population.

Question In what way does social service work play its part in the clinic set up?

Dr. Lombard At the first visit of the patient to a cancer clinic, information is obtained by the social service worker regarding the symptoms and their duration, the motivating cause for coming to the clinic, identifying data, age, sex, whether other doctors had been consulted, the interval since onset of symptoms that had elapsed prior to first consultation with a physician and the interval between first consultation with a physician and consultation at the clinic, and the reasons for delay in seeking diagnosis. One of the physicians in charge of the clinic dictates the medical findings and the recommendations. The patient is returned to his physician and treatment is determined by this physician, and effected in some cases

* Green Lights to Health—broadcast given by Dr. Herbert L. Lombard on Wednesday March 27 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

nth and in some cases without the assistance of the social service worker in making arrangements. The worker allows each cancer patient, obtains hospital transcripts of operations and other therapy, and keeps in touch with the patient throughout life. If the patient moves, the record is continued by the worker in the section of the new residence. If the patient leaves the State, attempts are made to contact him through existing agencies. The majority of lost patients are those who have left the State and with whom it is impossible to establish a local contact.

Question What happens to these records?

Dr Lombard All these records are verified, coded and indexed and tabulated by experienced workers under the supervision of an experienced biometrician.

Question Did more people come to the cancer clinics last year than formerly?

Dr Lombard Over 5000 individuals attended the cancer clinics in 1939. This was the largest number that has ever been seen at these clinics. However the cancer patients at these clinics represent only about 10 per cent of the total number of cancer patients of the entire State. It is true today as in the early part of the program that the majority of individuals with cancer go to their family physicians. With this in mind the department is endeavoring to help these physicians as much as possible. This is being done by furnishing them with the latest literature on cancer and conducting teaching clinics for their benefit. This spring through funds made available from the Federal Government and the Women's Field Army a monograph on cancer is to be furnished every physician and all libraries in the State. This should be of inestimable help. The physicians are also helped by the Tumor Diagnosis Service, to which every physician in the State may send tissue specimens, suspected for malignancy for diagnosis.

Question Has the use of this service been increasing?

Dr Lombard The number of specimens received last year far exceeded that of any preceding year. A part of his increase is believed to be due to the extension of the Co-operative Cancer Control Committee.

Question I understand the function of these committees is to invite a local physician to speak to them on cancer at least once a year. I also understand that all the organizations of a given community belong to this organization. How near completion is the total organization?

Dr Lombard We have contacted over 80 per cent of the organizations in the State and invited them to join in this movement. It is expected within the next year that the remaining organizations will be enrolled in the Co-operative Cancer Control Committee. When you consider nearly 20,000 organizations eventually functioning and asking their physicians to address them each year on the subject, the educational value of this program may be seen to be enormous.

Question What is the relation between the clinics and the educational program?

Dr Lombard There is no direct connection between these two organizations. The function of one is limited to education of the public that of the other to furnish consultative service for the diagnosis of cancer. It is perfectly true that the attendance at the clinics increases proportionately with the amount of education in the community and for a rounded cancer program both functions are necessary. Administratively they are entirely separate, from the standpoint of cancer control they are closely united.

Question Do you think there is any relation between the Tumor Diagnosis Service and education?

Dr Lombard There is no administrative connection between these two services but the volume of specimens sent to the Diagnosis Service is greater after a community has been organized into the Co-operative Cancer Control Committee than formerly. It is probable that the cancer consciousness which increases in the community with the functioning of the Co-operative Cancer Control Committee stimulates interest and as a consequence, a larger number of tumors suspected of being cancerous are sent to the service.

Question What is the connection between the clinics and the hospitals?

Dr Lombard Every clinic is located in a hospital. The hospital furnishes the room for the clinic, the equipment and nursing service. Patients, however are not referred directly from the clinic to the hospital unless their attending physician so desires. All patients are returned to their physician, and he determines the place for treatment. Some patients return to the hospital at which the clinic was located some go to one of the two state cancer hospitals while some go to other hospitals.

Question Is the attendance at clinics weighted by the lower economic group or does it represent a cross section of the population?

Dr Lombard The clinics are open to anyone in the State regardless of his financial status. It is true that a large number of the population that attend the clinics are from the low income group. It is also true that a few people with large incomes go to the clinics, but the cross section of the clinic population is of a lower financial rating than a cross section of the total population of the State.

Question Does the clinic population present particular types of cancer in the ratio of their total occurrence?

Dr Lombard Although the clinic population measures about 10 per cent of the cancer load it is not evenly distributed by types of cancer. It is heavily weighted with cancers of the mouth, breast, uterus and skin, and contains less than 10 per cent of digestive-tract cancers.

Question What is the interrelation between the medical profession, the general public and the Department of Public Health in this effort to control cancer?

Dr Lombard The interrelation lies primarily in the oneness of purpose—the desire of each, in its own sphere, to improve the cancer situation. The essence of the success of the educational methods of the Massachusetts Cancer Program lies in its inherent sharing of known facts about cancer by a generous and informed profession with a co-operative and receptive public. Fears are not stressed they are rationalized. Symptoms are not presented as the basis of exact knowledge they are merely alluded to in the discussion of the large problem. The physician with his increasing interest in the progressive steps of the knowledge of the disease, presents the subject simply and intelligibly. The public, responding as an individual would respond to a real discussion of an absorbingly interesting subject, rises to the mental challenge of this approach. As a result, all classes, groups, races and professions are united in this basic co-operative and successful program which disseminates exact knowledge concerning cancer. This engenders a realization of the need for prompt action. Exact knowledge and prompt action effect control.

DEATHS

CALLANAN—**FRANCIS J. CALLANAN, M.D.**, of Boston, died April 21. He was in his forty-fifth year.

Born in Boston, he attended Harvard University and received his degree from Harvard Medical School in 1918. He served his internship at the Massachusetts General Hospital. Dr. Callanan was a trustee of the Boston State Hospital, secretary of staff of the Massachusetts Women's Hospital and a member of the board of directors of the Household Nursing Association.

He was a member of the Massachusetts Medical Society, the American Medical Association and the American College of Surgeons.

His widow, a sister and a brother survive him.

RICE—**WALTER H. RICE, M.D.**, of Boston, died April 19. He was in his sixty-ninth year.

Born in Fitchburg, he graduated from Tufts College Medical School in 1896 and from Harvard Medical School in 1899. He also studied in Rome and Munich and had served at Charcot's clinic in Paris.

He was a fellow of the Massachusetts Medical Society and the American Medical Association.

A son, two sisters and a niece survive him.

WALCOTT—**HENRY J. WALCOTT, M.D.**, of Concord, died April 17. He was in his sixty-eighth year.

Born in Concord he graduated from Columbia Institute in New York and received his degree from Jefferson Medical College of Philadelphia in 1896. Dr. Walcott had been medical examiner for the Thirteenth Middlesex District for the past twenty-eight years and surgeon at the state reformatory at Concord for thirty years. He was one of the founders of the Emerson Hospital, Concord, and at the time of his death was the senior member of its staff.

He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow, a son, a daughter and three grandchildren survive him.

YOUNG—**EDWARD W. YOUNG, M.D.**, of New Bedford, died April 16. He was in his fifty-fourth year.

Born in Taunton he received his degree from Tufts College Medical School in 1913. After serving his internship at St. Luke's Hospital, New Bedford, he set up his practice there.

Dr. Young was a member of the Massachusetts Medical Society, the American Medical Association and the New Bedford Medical Society. He was also on the staff of St. Luke's Hospital.

His widow, a daughter, a sister, three brothers and a nephew survive him.

MISCELLANY

ARMY EXPERIENCE FOR PHYSICIANS

An interesting medical corollary to the augmentation of the United States Army during 1940 and 1941 and to the planned large scale Army maneuvers during the spring and summer of 1940 is the broad medicomilitary experience which a great number of civilian physicians will receive. Medical reserve officers are being used to augment the entire Army Medical Service, which includes everything from small unit installations to large station hospitals, general hospitals and hospitals designed primarily for the treatment of specific types of cases.

Physicians under thirty-five years of age who are desirous of obtaining extended active duty with the Army but who do not hold reserve commissions are being offered appointments in the Medical Corps Reserve in the grade of first lieutenant, in order to permit them to be placed on such duty. Captains and lieutenants are at present being offered excellent assignments throughout continental United States, and it is hoped that authority will be granted to permit some officers to go to Hawaii and Panama. In addition to having a new and very busy experience in the practice of medicine, the average officer finds the pay and allowances attractive. The pay and allowances for a married first lieutenant amount to approximately \$263 a month, for a single first lieutenant to approximately \$225 a month, for a married captain to approximately \$316 a month, and for a single captain to approximately \$278 a month. In most cases the above pay and allowances would apply inasmuch as government quarters are not usually available for officers on extended active duty. In the few cases where government quarters are available, the amounts would be \$40, \$60, \$60 and \$80 less per month respectively. In addition, the officer is reimbursed for mileage traveled from his home to his station, and on completion of his tour of duty is reimbursed similarly for the travel to his home.

Application for one year of active duty, or for appointment in the Medical Corps Reserve with a view to obtaining one year of active duty with the Army, should be requested at once by a letter addressed to the commanding general of the corps area wherein the physician permanently resides. In addition, the application should contain concise information regarding permanent address, temporary address, number of dependents, earliest date available for active duty, and that internship has been (or will be) completed, and it should be accompanied by a report of physical examination recorded on the Army Form WD AGO 63, which may be obtained from any Army station. From the group of reserve officers placed on extended active duty since August, 1939, over 2 per cent of those within the age requirements of thirty-two years or less for commission in the Army Medical Corps found military service sufficiently to their liking to cause them to take entrance examinations for the United States Army. Inquiries from those residing in the First Corps Area (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut) should be addressed Army Base, Boston 9, Massachusetts.

CITY AND RURAL HEALTH CONSERVATION CONTESTS

Winners in the 1939 City and Rural Health Conservation Contests were recently announced by the Chamber of Commerce of the United States. These contests are conducted annually by the organization in co-operation with the American Public Health Association for the purpose of furthering adequate health protection and health promotion services throughout the United States. The competent manner in which a community is meeting its health problems is the basis on which the awards are made. This does not necessarily mean that awards are made to the healthiest communities. A group of public health experts from all parts of the country carefully appraise each participating city and county. Each community is graded on what measures it takes to provide and safeguard its water supply, to furnish adequate and safe sewerage disposal, to reduce infant and maternal deaths, to combat tuberculosis and syphilis, to protect its citizens against other communicable diseases, to ensure

healthy children to protect and safeguard its milk and other foods, to promote effective co-operation with its physicians and dentists in furnishing necessary services to all those who need them and to enlarge and improve its lay-understanding of ways and means of preventing sickness and death and of maintaining good health.

In the City Health Contest the winner in Group I (cities of over 500,000 population) is Milwaukee, Wisconsin, with an award of merit to Baltimore, Maryland. In Group II (cities of 250,000 to 500,000 population) Memphis Tennessee, is the winner, with awards of merit to Louisville, Kentucky Newark, New Jersey Dallas, Texas, and Toledo, Ohio.

In Group III (cities of 100,000 to 250,000 population) the winners are tied,—New Haven and Hartford, Connecticut,—with awards of merit to Grand Rapids Michigan, Yonkers, New York, Reading, Pennsylvania, Springfield, Massachusetts, and Erie, Pennsylvania. The winner in Group IV (cities of 50,000 to 100,000 population) is Newton, Massachusetts, with awards of merit to Evanston, Illinois, Schenectady, New York, Pasadena, California Madison, Wisconsin, East Orange, New Jersey Racine, Wisconsin, and Sacramento California.

In Group V (cities of from 20,000 to 50,000 population) the winners are tied,—Greenwich Connecticut, and Plainfield, New Jersey with awards of merit to Hackensack, New Jersey Winona Minnesota, Brookline, Massachusetts, Stamford, Connecticut, and Orange, New Jersey. The winner in Group VI (cities of less than 20,000 population) is Englewood, New Jersey with awards of merit to Asbury Park, New Jersey Hibbing Minnesota, and Virginia Minnesota.

In the Northeastern Division of the Rural Health Contest the winner is Alger-Schoolcraft Health Unit, Michigan. Awards of merit go to District No. 7, Gladwin Michigan Chippewa County Michigan, District No. 2, West Branch Michigan Mecosta-Oscoda Health Unit, Michigan, Wayne County Ohio, Saginaw County Michigan, Barnstable County Massachusetts, Lorain County, Ohio, and Berkshire District, Massachusetts.

NOTES

The appointment of Dr. Kurt Goldstein as clinical professor of neurology at Tufts College Medical School made possible by a five year grant for teaching and research in neurology from the Rockefeller Foundation was recently announced by President Leonard Carmichael. Dr. Goldstein will begin his appointment on June 1. He was William James Lecturer at Harvard last year and since 1936 has been on the medical faculty at Columbia University and chief of the Neurological Laboratories at Montefiore Hospital in New York City. Dr. Goldstein will be attached to the Neurological Clinic of the Boston Dispensary.

Five awards for study at the Harvard Medical School during the next academic year were recently announced as follows: George Chase Christian Memorial Scholarship to John E. Skogland, M.D., University of Minnesota 37 of Keewauqua, Minnesota, at present clinical instructor Division of Nervous and Mental Diseases, University of Minnesota. Daniel A. Buckley scholarships to William J. Baker 234, of Cambridge, and Chester J. Dziengielewski 4C, of Cambridge. Frederick E. Parlin Scholarship to Irving M. London 1M of Malden Stoughton Scholarship to George S. Kurland 4C, of Dorchester.

REPORTS OF MEETINGS

WILLIAM HARVEY SOCIETY

At a regular meeting of the William Harvey Society of Tufts College Medical School held at the Beth Israel Hospital on January 12 Dr. Stanhope Bayne-Jones, dean of the Yale University School of Medicine, spoke on "The Relation of Viruses to Cancer." In opening his address he made some general remarks about the properties of viruses, such as their size and the question of whether or not they may all be considered as living organisms. The isolation of the virus of tobacco mosaic disease and those of other types, he said, is not considered by geneticists and crystallographers incompatible with living matter. The manner of their reproduction was considered as possibly autocatalytic, a sort of spontaneous generation under a new name. In support of such a theory the experiments of Northrop Stanley and others were cited. In general viruses may be necrotizing and destructive, such as that of vaccinia or proliferative, such as those of contagious epithelioma and chicken sarcoma.

Dr. Bayne-Jones then discussed some examples of tumor formation initiated by a virus. First was chicken sarcoma, which has been produced repeatedly by cell free filtrates of the tumor. It was suggested that the virus might be the determining factor in the type of tumor resulting. A less well known example of a virus tumor is adenocarcinoma of the kidney in the frog. Then was cited fowl leukemia, which appears to have had its virus etiology proved despite the evidence that a leukemic cell is necessary for the transmission of leukemia in mice. And since this latter disease is not transmissible after ultra filtration careful scrutiny was advised for all investigations where the presence of cells, as well as of the filterable virus, is possible or questionable.

An outstanding characteristic of these tumors is that one may recover potent cell-free filtrates from the tissue, and in amounts proportional to the growth of the tumor. The same is not true in similar neoplasms in mammals, however. Thus, in the Shope rabbit epithelioma the virus disappears from the papillomatous growth in many cases, particularly in domesticated animals. And yet these tumors may progress from benign to malignant stages in the absence of demonstrable virus. It has been assumed by Rous and the other proponents of a virus etiology for tumors that this absence of an ultrafilterable factor may be explained by its neutralization by the tissue fluids of large carcinomas.

One of the most convincing experiments in support of the virus theory was the production by Rous of carcinomas in inadequately tared rabbits by the added influence of the Shope virus. It had been predetermined that the exposure of a susceptible surface to a carcinogenic tar required a minimal amount of rubbing in order to ensure a high incidence of epitheliomas. It was in a group of rabbits proved to be insufficiently treated by such standards that Rous was able to raise markedly the incidence of carcinomas by the supplementary use of the Shope virus.

Dr. Bayne-Jones stated that it was an accepted fact that tumors could be produced by viruses in frogs and fowl and that a virus was demonstrable in these tumors. On the other hand, one has not been able to extract a filterable virus of tumor-producing potentialities from mammalian malignant tumors.

Dr. Bayne-Jones concluded his discussion in an attempt to stimulate his audience to seek the ultimate mechanism of malignant change whereby cells become "not lawless but assume a law of their own." Any reproducing cell

was represented as being potentially malignant, and any increased potentiality, once present, was considered permanent. The many remote causes of cancer cited by the speaker—those responsible for the "causogenesis" of Murphy—included the hydrocarbons, the azo dyes and simple zinc chloride. The opponents of the virus theory place viruses in this category, while the proponents would like to think of them as intimate causes

CUTTER LECTURE

The first 1940 Cutter Lecture on Preventive Medicine was given at the Harvard Medical School on January 15, with Dr John E Gordon introducing the speaker, Dr Ludvig Hektoen, executive director of the National Advisory Cancer Council and emeritus professor of pathology at the University of Chicago. His subject was "Cancer Control, with Special Reference to Public-Health Aspects." The speaker inaugurated his discussion by reminding his audience that the prime purpose of any cancer program should be to promote the prevention of cancer and to do the best that can be done at the time for the cancer patient no matter what his means or the stage of his cancer. Dr Hektoen attempted only to explain the features of the control aspects of the program, leaving the research problem for a subsequent lecturer.

Allusion was made to the basic importance of education in any attempt to bring about the early diagnosis and prompt treatment of a condition where the first step depends on the patient. Special tribute was paid to the capable work in this phase by the American Society for the Control of Cancer. A second fundamental necessity, where there may exist lack of financial means as well as of knowledge, is for governmental subsidy of some nature. The prototype of such a system is that existing in Massachusetts, where there are two state cancer hospitals, a free, tumor diagnostic service and twenty-two state-aided clinics strategically located to care for the needs of the indigent and the medically indigent patient. This example has been more recently followed by an increasing number of states, subsequent to the demonstration by Massachusetts of a definite reduction in the adjusted cancer death rate for women and a similar suggestive trend for men.

One of the pioneer states in the field of cancer investigation was New York, which in 1898 established a laboratory for research, and in 1910 made available a free diagnostic clinic. Dr Hektoen read part of a recent report from the New York state commission, in which it was concluded that diagnostic facilities were lacking in hospitals of less than 100 beds, that there was a poor geographic distribution of x-ray facilities and tumor clinics so that there was need of 25 additional units in each instance, and that the follow-up of cases and terminal care were not adequate. The commission suggested that the guiding principle should be a tendency to decentralization and to more efficient use of already existing institutional facilities. Further recommendations favored a reorganization of the public-health system to include a cancer-control program, the compulsory reporting of cancer cases, an improved follow up system for state-aided clinics, and a statistical and epidemiological study of the problem. It was concluded from their study that a proper use of the available knowledge concerning cancer could produce a lower death rate from this condition.

The vast proportions which the cancer problem is rapidly assuming were suggested by an analysis of a survey of the Veterans' Administration, which has 4,000,000 men under its care. Between 1938-42, when the average age of these men is forty five to forty-nine years, 20,000 deaths

might be expected from cancer, while twenty years later this number, under present conditions, would be trebled. This unit has already outlined a plan to combat the scourge by education, early diagnosis and prompt treatment. Six centers have already been set up, the largest with accommodations for 400 men.

Dr Hektoen went on to discuss the attempt of the American College of Surgeons to elevate the standards of cancer centers by listing approved clinics of more than 100 beds. There are now 307 such clinics, of which 42 are diagnostic only. A steady increase in the number has indicated that their value has been accepted.

In regard to the role of the local physician, the speaker stressed that he is often the first man whose advice is sought for evaluation of a patient's suspicions and for advice as to a proper clinic to attend for diagnosis and treatment. Although there is some limitation at present in diagnosis and treatment, there is none in prevention, Dr Hektoen stated. Among preventable neoplasms cited were those following exposure to tar, dyes and roentgen rays and those developing on pre-existing areas of chronic inflammation, particularly in the gastrointestinal tract, uterus and skin. A more recently recognized condition which should probably be included is the premalignant degeneration of the oropharyngeal mucosa found in the Plummer-Vinson syndrome subsequent to long-continued malnutrition.

Finally, Dr Hektoen discussed the role of the Federal Government in the cancer problem. The federal cancer program of May 5, 1937, set up a National Cancer Institute to study the problem in all its ramifications, to correlate various forces, to obtain radium, to train competent specialists, to provide and administer fellowships, and to arrange for national and international consultations whenever necessary for the elucidation of problems. There is also a National Advisory Cancer Council of six members, with the surgeon general as *ex-officio* chairman, which makes recommendations for research, spreads educational propaganda and reviews applications of institutions and individuals seeking grants. Appropriations voted for the work amounted to \$400,000 in each of the years 1937-8 and 1938-9, with \$570,000 being available for the present fiscal year. The sum of \$150,000 was used for the erection of a building to house the National Cancer Institute, where research is being conducted into the types of carcinogenic substances, their modes of action, the biology and biochemistry of cancer cells, and the evaluation of new and revived types of therapeutic agents, with particular reference to the efficacy of various roentgen-ray voltages and isotopes of radio-active substances. The speaker also mentioned the advantages resulting from the collaboration of federal agencies with other institutions and local public-health boards.

In conclusion, Dr Hektoen stated that lack of intelligent organization and co-operation was largely responsible for the inadequate use of available knowledge and facilities, and consequently was an obstacle in attaining a reduced cancer death rate.

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society at the Peter Bent Brigham Hospital on January 23 was presided over by Dr Robert Zollinger.

The first case, presented by the medical service, was that of a sixty-seven-year-old Pullman porter, who entered the hospital because of pallor of one week's duration and exertional dyspnea for three months. Forty years previously the patient had had a primary syphilitic lesion, and his wife was known to have had a typical syphilitic preg-

ancy cycle. Two years before entry an attack of mild rhinitis had responded to bedrest, and six months before here had been an episode of severe migratory arthritis successfully treated by salicylates and bedrest. Exertional typica, first noted three months prior to entry had become more marked after two months, and the patient as digitalized by his local physician. Paroxysmal dyspnea while at complete rest was a recent development, as was also difficulty in dexterous manual maneuvers. Physical examination revealed a Negro with marked pallor and gray hair which had been present since the age of twenty-five. Dyspnea was easily brought about. The pupils reacted normally but the fundi showed old and recent hemorrhages and "cotton-wool" exudate. The heart was enlarged, and there was a medium grade apical systolic murmur. The knee jerks were symmetrically diminished, the ankle jerks absent, and vibratory sensations normal. Laboratory data revealed an erythrocyte count of 30,000, a leukocyte count of 5900, a hemoglobin of 28 per cent and a stained blood smear exhibiting extreme macrocytosis with marked polychromatophilia and numerous sickle-shaped erythrocytes. The platelet count was 80,000, and cell volume studies showed a hematocrit of 12.5 per cent and a mean corpuscular volume and mean corpuscular hemoglobin concentration about twice the normal values of 85 to 100 cubic microns and 26 to 32 micrograms respectively. The Hinton test was positive. Treatment consisted of transfusion with subsequent increase of the erythrocytes to 1,000,000. The use of intramuscular liver extract caused an increase in the red-blood-cell count of about 1,000,000 per day and elicited a response of leukocytes that reached a peak of 29 per cent in four days.

Dr. Soma Weiss, in discussing the case pointed out the following unusual characteristics: the occurrence of primary anemia in a Negro; the very low values, at least in the present case, for erythrocytes and hemoglobin; the extremely elevated color index and mean corpuscular volume; the manifest response to liver extract within twenty-four hours; and the lack of neurological manifestations in such a severe degree of anemia.

The second case, presented by the surgical staff was that of a forty-nine-year-old Irishman who had received a compound comminuted fracture of the lower leg from being struck by an automobile one month before. There had also been a concussion of the brain, with temporary loss of consciousness, and a back injury. On admission his blood pressure was 90 systolic, 60 diastolic, and the patient showed evidence of incipient shock. Immediate treatment consisted of a 300-cc. blood transfusion followed when the patient's condition had sufficiently improved, by amputation of the injured tissue of the leg under local and later spinal anesthesia. Red blood cells found in the urine on admission gradually diminished in the next few days. On the third day the temperature suddenly rose and the patient complained of pain in the injured member. A window was made in the cast, which revealed bloody fluid, edema and gas bubbles. Culture revealed an atypical type of *Clostridium oedematis maligni* (*Vibrio septique*) and a blood culture yielded the same organism. Therapy consisted of sulfanilamide, 6 to 12 gm. per day which resulted in a blood level of 12.2 mg. per 100 cc., and roentgen treatment to the local lesion after opening it widely. The urine then became grossly bloody and x-ray examination revealed a fractured eleventh rib. The temperature suddenly rose to 105 F., and bile appeared in the urine. Consequently chemotherapy was discontinued and 40,000 units of polyvalent gas-bacillus antitoxin was administered. The jaundice and hematuria gradually disappeared while the local condition became

one of simple staphylococcal infection. Histaminase was employed as a prophylactic against serum reaction.

In discussion, Dr. Zollinger alluded to the improvement in treatment and in prevention of the spread of the dread gas-bacillus infection since 1933 when a similar episode had provoked a hospital epidemic. Dr. Charles A. Janeway emphasized that the isolated organism was not the usual offender (*Cl. welchii*) in civilian gas-bacillus infection and differed from the latter in forming edema more than gas and in being more invasive. Although sulfanilamide was considered probably responsible for the sterilization of the blood stream in this case, its efficacy in the treatment of such cases was not considered proved. The use of antitoxin was advocated as a valuable adjunct, if not as the more important part of therapy. Dr. Janeway finally cited some pertinent experiments on guinea pigs which support this theory. The control group which received no therapy died quickly of local and general infection; those treated with sulfanilamide, although showing evidence of local infection and appearing very sick, failed to succumb to the relatively mild systemic effects of the bacilli of those treated with antitoxin, the majority exhibited neither local nor systemic evidence of gas-bacillus infection. Dr. Carl W. Walter stated that most sterilizing techniques tend to foster sporulation, a fact which increases the difficulty of controlling the infection. He advocated, instead, the immediate destruction of bacterial life with heat and the subsequent cleansing of the contaminated articles.

Dr. Walter the speaker of the evening, presented a motion picture depicting the history, rationale and technique of "Steam as a Sterilizing Agent." As a preamble Dr. Walter indicated that the concept of sterility, despite its official definition as "that which is free of viable bacterial life," was given a wide variety of meanings practically. In reviewing the historical development of the subject, allusion was made to the classic work of Oliver Wendell Holmes in 1843 and Semmelweis in 1846 on puerperal fever as a communicable disease, largely preventable by proper cleaning by attendants between confinement cases. Lister from 1860 to 1867 applied Pasteur's theories to the treatment of compound fractures and tuberculous abscesses and consequently excluded air during operation. It was von Bergmann, however, who in 1882, saw the importance of instruments and dressings as a means of contamination and advocated their sterilization preoperatively with bichloride of mercury. This was the first of effort to substitute asepsis for antiseptics. Dr. Walter then traced the practical development of steam sterilization from Koch, Gaffky and Loeffler in 1881 through Redard, the von Bergmanns, and Schummelbusch in 1891 who perfected a ritual for preoperative technique which has since persisted largely unaltered.

The theoretical development started with Globbig (1887) who recognized the importance of resistant spores, and progressed via Gruber (1888) who proposed the gravity method of air clearance, Esmarch (1888) who proved the ineffectiveness of superheated steam, Redard (1889) who demonstrated the increase of temperature by an increase of pressure, Lewin (1889) who pointed out the importance of moisture in causing protein coagulation, Teuscher (1890) who showed the retardation of sterilization by an oil coating and the importance of regulating the chamber temperature by a thermometer in the exhaust line, Forsch and Clarenbach (1890), who emphasized that the quantity of the steam available rather than its pressure determined the effectiveness of a sterilizer, Rubner (1889) who demonstrated the variation of temperature with composition of air steam mixtures in vari-

ous parts of bundles, and, finally, Prescott and Underwood, who initiated (1897) the study of the bacteriology of sterilization in the canning industry, which culminated (1923) in the stamping out of botulism.

All these findings have been recently confirmed at the Peter Bent Brigham Hospital, and consequently Dr Walter is undertaking to educate the medical profession and the lay persons who often operate sterilizing plants, both of which groups have in general failed to accept and employ these fundamental concepts of steam sterilization. The speaker supplied the dialogue for an excellent motion picture which showed the improper traditional and the proper scientific technics of steam sterilization. The problem of air clearance, which is necessary for steam to be effective as a bactericidal agent, was solved by employing only loosely packed materials in unsealed containers or porous wrappers, by placing all layered packs in such a position that a horizontal path was assured for escape of air, and by placing fluffed gauze in the wrists of unfolded rubber gloves. The efficacy of a gravity rather than a vacuum type of air ejector was demonstrated and its economic advantages cited. The proper methods for sterilizing various types of materials were described, with particular attention being focused on rubber gloves, which should be properly prepared as outlined above and put in the upper part of the chamber, for the delay and prolonged exposure otherwise entailed are definitely deleterious to the material.

Dr Walter explained charts which indicated the efficacy of moist rather than dry heat and the more effective and rapid sterilization by saturated steam than by either a stratified or homogeneous mixture of air and steam due to faulty air clearance. The effects of faulty positioning and overloading as a cause of pocketing air and preventing adequate sterilization were also demonstrated. Another mistake mentioned was the repeated short exposures used, which serve only to reheat the outer layers of any bundle without causing sufficient moistening and heating of the center.

In conclusion, Dr Walter suggested the following practical measures: the use of temperature rather than pressure as an indication of chamber steam, since an air-steam mixture may attain sufficiently high pressure, the use of a thermometer in the exhaust line to determine the prevailing chamber temperature, the use of a thermo-responsive timer, which records only with sustained temperature and so prevents repeated reheatings. The standard technic, to be carried out by a responsible personnel, should consist of the maintenance of a temperature of 250°F, as measured by the exhaust thermometer, for thirty minutes continuously, as measured by the thermo-responsive timer.

NOTICES

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, May 1, from 2 to 4 p.m. Drs. Robert Zollinger and Soma Weiss will speak on "Vomiting."

Physicians and students are cordially invited to attend.

BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Monday, April 29, in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon. "The Boston Dispensary" will be the subject of the third in a series of talks by different speakers on the past, present and future of the New England Medical

Center and its constituent units. Mr. Charles C. Cabot will speak on "Problems of Financing and Support," and Mr. Frank E. Wing will discuss "Its Origin and Its Objectives."

MASSACHUSETTS GENERAL HOSPITAL

A meeting of the Hospital Research Council will be held in the Ether Dome of the Massachusetts General Hospital, on Tuesday, April 30, at 5 00 p.m.

PROGRAM

The Bence-Jones Protein and Pseudo-Bence-Jones Proteins. Dr. Bernard M. Jacobson.

The Significance of Enzymatic Destruction of Synovial Fluid Mucin. Drs. William V. B. Robertson, Marian W. Ropes and Walter Bauer.

The Relationship of Chemical Constitution and Anesthetic Potency to Cortical Potentials. Dr. Henry K. Beecher.

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, May 14, at 12 o'clock noon. Dr. William B. Breed will speak on "Emergencies in Medical Practice."

Physicians are cordially invited to attend.

GREATER BOSTON MEDICAL SOCIETY

The twenty-fifth anniversary dinner meeting of the Greater Boston Medical Society will be held at the Hotel Kenmore, Boston, on Tuesday, May 7, at 6 30 p.m. Dr. Benjamin Spector and Mr. Charles E. Wyzanski, Jr., will be the speakers.

AWARDS FOR OBSERVATIONS ON EPILEPSY

Two annual awards of \$100 each are offered by the Laymen's League against Epilepsy for the best original unpublished observations or investigations bearing on the subject of epilepsy. One of these is for work done in a state epileptic colony or mental hospital, the other is for work done elsewhere. Since one object of the award is the encouragement of junior workers, the committee will take into consideration the facilities of the authors, clinical as well as laboratory studies will be welcomed. Awards will be made by a committee of three, composed of the president of the American League against Epilepsy, the chairman of the Section on Convulsive Disorders of the American Psychiatric Association, and a third physician chosen by the officers of the Laymen's League against Epilepsy. It is hoped that winning contributions will be presented before the annual joint scientific session of the first two of these organizations. At the discretion of the committee awards may be divided or postponed.

Papers for 1940 should be submitted by December 15. Further information can be obtained from the secretary of the Laymen's League against Epilepsy, Mrs. N. Bond Fleming, 25 Shattuck Street, Boston.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children

will be held in the classroom in the nurses' residence of the hospital on Thursday, May 2, at 7 15 p.m.

Mr James T. Pugh the guest speaker will present the subject "The Legal Aspect of Medicine."

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|--------|-----------------------|
| Haverhill | May 1 | William T. Green |
| Lowell | May 3 | Albert H. Brewster |
| Salem | May 6 | Harold C. Bean |
| Brockton | May 9 | George W. Van Gorder |
| Gardner | May 14 | Mark H. Rogers |
| Northampton | May 15 | Garry deN. Hough Jr. |
| Worcester | May 17 | John W. O'Meara |
| Pittsfield | May 20 | Francis A. Slowick |
| Fall River | May 27 | Eugene A. McCarthy |
| Hyannis | May 28 | Paul L. Norton |

ST FRANCIS HOSPITAL (HARTFORD) ALUMNI

The annual meeting of the intern alumni and the regular and courtesy staffs of St. Francis Hospital Hartford, Connecticut, will be held at the Wampanoag Country Club, West Hartford, on Tuesday, May 21 at 6 30 p.m.

NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The fifth annual convention of the National Gastroenterological Association will be held June 4, 5 and 6 at the Hotel Roosevelt, New York City. Papers by authoritative speakers from various parts of the United States will be given during the mornings and afternoons of all three days, and each will be discussed by well-qualified physicians. The luncheons on all three days will be followed by round-table conferences. The Committee of Ladies is arranging an interesting program of social activities for the families and friends of the visiting members.

Among the scheduled speakers are Drs. C. S. Keefer, Robert Zollinger, R. B. Cattell, I. R. Jankelson and C. W. McClure, of Boston; the discussors include Drs. Carl Bearse, H. G. Dunphy, G. W. Papen and L. F. Curran, of Boston; Dr. R. F. Scholl, of New Haven, Connecticut; and Dr. L. R. Whitaker, of Portsmouth, New Hampshire.

Members of the medical profession are cordially invited to attend. More detailed information and copies of the program may be obtained by application to Dr. Henry Kendall, 16 East 96th Street, New York City.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY APRIL 28

MONDAY APRIL 29
12 m. Boston Dispensary. Luncheon meeting of the clinical staff. Joseph H. Pratt Diagnostic Hospital.

TUESDAY APRIL 30
9-10 a.m. The Soldier and His Heart. Dr. P. D. White. Joseph H. Pratt Diagnostic Hospital.
5 p.m. Hospital Research Council, Massachusetts General Hospital.

WEDNESDAY MAY 1
9-10 a.m. Hospital case presentation. Dr. J. E. Paullin. Joseph H. Pratt Diagnostic Hospital.
7-8 p.m. Vomiting. Drs. Robert Zollinger and Soma Weiss. Peter Bent Brigham Hospital.

THURSDAY MAY 2
9-10 a.m. Clinicopathological conference. Dr. C. S. Keefer. Joseph H. Pratt Diagnostic Hospital.
7 15 p.m. The Legal Aspect of Medicine. Mr. James T. Pugh. New England Hospital for Women and Children.

FRIDAY MAY 3

9-10 a.m. A Review of Diabetes. Dr. E. P. Joslin. Joseph H. Pratt Diagnostic Hospital.

SATURDAY MAY 4

9-10 a.m. Hospital case presentation. Dr. J. E. Paullin. Joseph H. Pratt Diagnostic Hospital.

Open to the medical profession.

May 5—Boston Doctors' Symphony Orchestra concert. Page 687 issue of April 15.

May 7—Greater Boston Medical Society. Page 736.

May 9—Pentucket Association of Physicians. 8:30 p.m. Hotel Bartlett, Haverhill.

May 10-13—American Scientific Congress. Page 1043 issue of December 28.

May 13—United States Pharmacopoeial Convention. Page 202, issue of February 1.

May 14—South End Medical Club. Page 736.

May 15—St. Francis Hospital (Hartford) alumni. Notice above.

May 21-22—Massachusetts Medical Society Annual meeting, Boston.

June 4-6—National Gastroenterological Association. Notice above.

June 4-7—American Association of Industrial Physicians and Surgeons. Page 634 issue of April 11.

June 7-8—American Heart Association. Page 469 issue of March 14.

June 7-10—American Board of Obstetrics and Gynecology. Page 606, issue of April 4.

June 8 and 10—American Board of Ophthalmology. Page 719 issue of November 2.

June 10-14—American Medical Association. Annual meeting, New York City.

June 10-14—American Physicians' Art Association. Page 332 issue of February 21.

June 23-25—Maine Medical Association. Annual meeting, Bangor, Lakes.

October 8-11—American Public Health Association. Page 655 issue of April 11.

October 21—American Board of Internal Medicine, Inc. Page 369 issue of February 29.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

May 8—Annual meeting. Salem Country Club, Peabody.

FRANKLIN

May 14—Franklin County Hospital, Greenfield.

HAMPSHIRE

May 8, at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

May 15 at 12:15 p.m. at the Unicorn Country Club, Stoughton.

MIDDLESEX NORTH

July 31

October 30.

NORFOLK SOUTH

May 2.

PLYMOUTH

May 16—Lakerville State Sanatorium, Middleboro.

SUFFOLK

May 2—Censors' meeting. Page 244, issue of February 8.

WORCESTER

May 8—Worcester Country Club. Dinner at 6:30 p.m. followed by business and scientific meeting.

BOOK REVIEWS

New Ways in Psychoanalysis Karen Horney 313 pp.
New York: W. W. Norton & Co., Inc., 1939 \$3.00

This is a thoughtful volume written by an analyst of many years' experience. It discusses many complicated questions in the recent development of psychoanalysis. Any attempt to evaluate the volume must take into consideration Freud's various revisions of his original views in the light of further clinical observations. Like many scientific disciplines, the theory and technique of analysis have undergone changes within the last fifty years. For

instance, its former rather static concepts have given way to a more dynamic viewpoint, particularly since the functions of the ego and its aberrations have become more clearly understood. Psychoanalysis began with a biological orientation as a genetic instinct psychology, at present, it is both biological and sociological in its presentations and technic. The original, basic ideas have remained, but newer discoveries and observations are being given greater prominence due to increased clinical experience.

It seems that the purpose of Dr. Horney's book is an attempt, as she claims, to rid psychoanalysis of the heritage of the past so that its greater potentialities may develop and thus make a critical evaluation of both psychoanalytic theory and therapeutic technic. She states, for instance, "the purpose of this book is not to show what is wrong with psychoanalysis but through eliminating the debatable elements to enable psychoanalysis to develop to the height of its potentialities." Of course, psychoanalysis is a new science, many of its problems remain unsolved, consequently, her emphasis on this point is not new, as no analyst today believes that psychoanalysis is a finished product.

She emphasizes environment as responsible for creating neurotic conflicts and, in addition, insists on other clinical factors in the genesis of the neuroses. For instance, she believes that sexual difficulties are the effect rather than the cause of neuroses. She claims that the aim of analytic therapy is to lessen the anxiety of the patient and not gain mastery over instinctual drives.

In the course of the volume, she criticizes Freud's biological orientation and claims that he remained an instinct theorist, consequently she insists that neurotic conflicts are also determined by cultural and environmental conditions. She discards the theoretical implications of the Oedipus complex and seems to overlook the fact, even with her sociological orientation, that this complex is the first social experience of the child. Freud in 1923, in a paper on a neurosis of demoniacal possession occurring in the seventeenth century, understood the sociological implications of the neuroses and, furthermore, Ferenczi and Rank, in 1925, emphasized this social aspect of psychoanalysis.

The reviewer believes that it is impossible to make a gap between social setting and either psychological or biological setting. This is shown by the fact that neuroses may assume different clinical forms under different cultural conditions. According to Dr. Horney the patient's neurotic difficulty is a compulsory need to appear perfect, whereas according to Freud it is the unconscious feelings of guilt which form the main obstacle to the cure of the severe neuroses. She maintains that Freud's work has certain limitations in the understanding of cultural factors and that he remained an instinct theorist. In reply to this viewpoint it can be stated that the symptoms of the neuroses, besides being cultural or sociological in nature, are also psychological, cultural conditions are produced by instinctual drives and, inversely, instinctual drives produce cultural patterns. According to her, also, anxiety, which is an essential symptom of every neurosis, is frequently the result of being in some acute dilemma without being aware of it, whereas, according to Freud, the therapy of anxiety is a search for repressed drives and ego defenses. Her insistence on active therapy in analysis is not new, since this procedure has been utilized for some years. The important aim of therapy is to carry the analysis along until the patient can find a satisfactory solution in his life situation.

It must be emphasized that psychoanalysis began as a medical discipline and still remains so, and her challenge that it neglects the social aspect of the neuroses is merely

her own insistence on revision, which, when the book is carefully read, is not so revolutionary as the uninformed reader might be led to believe. For instance, her statement that anxiety in the neuroses is the result of the failure of the specific safety devices of the ego to operate, but another way of stating that this anxiety is due to weakening of the defenses of the ego, from whatever cause.

A History of Tropical Medicine Based on the Fitzpatrick Lectures H. Harold Scott. 2 vol. 1165 pp. Baltimore: William Wood & Co., 1939. \$12.50 per set.

These volumes are based on the Fitzpatrick Lecture given by the author. He begins with an account of the slow progress of hygiene at sea and in the military service in the eighteenth and nineteenth centuries and, to complete the background, discusses early conditions in some of the British dependencies. Subsequent chapters are devoted to the principal tropical diseases. Their history is traced in detail to the earliest available records.

The accounts of malaria, yellow fever and the avitaminoses are likely to be of special interest to Americans. With reference to malaria in America, the statement is made (page 128) that "it is the general belief that malaria was originally introduced either from Europe or by the slaves from Africa." Although the reviewer shares this opinion, he doubts that it has received wide acceptance.

A long chapter on yellow fever scarcely mentions Carter's important contribution to the history of this disease (*Yellow Fever: An epidemiological and historical study of its place of origin*, Baltimore: Williams & Wilkins, 1931) but in other respects it is admirable. The chapter on the avitaminoses is devoted largely to beriberi, the early history is excellent, but the progress of the past ten years is not mentioned. A short chapter on the Panama Canal, another on the slave trade with reference to disease, and a series of short biographies of persons who have made great contributions to the subject of tropical medicine are likely to prove of general interest.

The reviewer is impressed with the magnitude of the task undertaken by the author and with the success which he has achieved in providing a most useful book of reference.

The International Medical Annual: A year book of treatment and practitioner's index. Edited by H. Leubke, Tidy and A. Rendle Short. Fifty seventh year. 602 pp. Baltimore: Williams & Wilkins Co., 1939. \$6.00.

This annual is in its fifty seventh year. The book covers the whole field of medicine as viewed by numerous English authors. There is the usual general index, and a series of excellent illustrations from a wide variety of publications. The reviews are carefully done, and this is an important addition to the medical literature which aids the physician in keeping abreast of rapidly advancing medical research.

Les Embolies Cérébrales: Études de pathologie expérimentale sur les embolies solide et gazeuse du cerveau. Maurice Villaret and René Cachera. 134 pp. Paris: Masson et Cie, 1939. 32 Fr. fr.

This is a treatise in regard to experiments concerning the pathology of embolism of the brain. The authors have worked largely with dogs and have taken advantage of the cerebral window for the observation of the vessels in the living animals, as developed by Forbes at the Harvard Medical School. It is a valuable work in a small field.

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CLINICAL AND LABORATORY STUDIES ON THE USE OF SERUM AND SULFAPYRIDINE IN THE TREATMENT OF THE PNEUMOCOCCAL PNEUMONIAS*

MAXWELL FINLAND, M.D.,† FRANCIS C. LOWELL, M.D.,‡ AND WILLIAM C. SPRING, JR., M.D. §

BOSTON

AMONG the recent reports on the treatment of pneumococcal pneumonia, those which emanated from clinics where both specific serums and sulfapyridine were used extensively have shown that each of these two agents is highly effective. Most of the workers, however, have agreed that a definition of the conditions under which the use of serum alone, sulfapyridine alone or the combination of the two will give the optimum benefit must await the accumulation of a large amount of data subjected to detailed and critical analysis. In this paper we present a résumé of the results of laboratory and clinical studies bearing on this subject which were conducted at the Boston City Hospital during 1938-1939. The details of these studies are reported elsewhere.¹⁻⁴

LABORATORY INVESTIGATIONS

These concerned the mode of action of sulfapyridine on pneumococci and the significance of antibody in this action, the humoral antibody response of sulfapyridine-treated patients and the absorption, excretion and distribution of sulfapyridine. A number of these observations merely confirm and extend the results of similar studies reported by other workers. Our results will be summarized briefly.

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard) Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston.

Technical assistance was given in the bacteriological and immunological studies by Mildred W. Barnes and Clara Wilson; in the pneumococcus typing by Kathleen Daley and Winifred Doyle; and in the chemical determinations by Margaret A. Adams and Nancy E. Mearns. The studies were made possible through the generous co-operation of the resident and visiting staffs of all the medical services and of the Mallory Institute of Pathology of the Boston City Hospital. The serums were furnished by the Lederle Laboratories, Inc., Pearl River, New York; the Massachusetts Antitoxin and Vaccine Laboratory; and E. R. Squibb and Sons, New York City. The sulfapyridine was furnished by the Lederle Laboratories, Inc., the Calco Chemical Company, Newark, New Jersey and Merck and Company, Rahway, New Jersey.

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Action of Sulfapyridine and Antibody*

Pneumococci were grown at 37°C in favorable artificial mediums, in human blood lacking pneumococcal properties and in each of these mediums after varying concentrations of sulfapyridine had been added. The resulting bacterial populations were determined at varying intervals. Both with and without sulfapyridine the initial parts of the growth curves over a period of four hours, and in some cases even up to eight hours, were found to be identical. Multiplication always took place and the population increased from tenfold to a thousandfold during this period. After four to eight hours the shape of the growth curve, indicating either continued growth, bacteriostasis or decline in population, depended mainly on three factors: the size of the original inoculum, the concentration of the drug, and the susceptibility of the strain of pneumococcus used. With large original inocula, the bacterial population either remained static or declined slowly over a period of three or four days. With smaller inocula this static phase lasted only four to eight hours and was followed by a comparatively rapid decline in the numbers of viable organisms, so that none could be recovered in subcultures made after eighteen to forty-eight hours. Concentrations of sulfapyridine of 10 mg per 100 cc. usually resulted in complete sterilization of the mediums within twenty-four to forty-eight hours, with original populations up to 10,000 diplococci per cubic centimeter, while a sulfapyridine concentration of 5 mg per 100 cc. resulted in a decline in population after eight hours only when very small inocula (10 organisms or less per cubic centimeter) were used. In some experiments with Type 3 pneumococci and human blood, 10 organisms per cubic centimeter multiplied a hundredfold to a millionfold in the presence of a sulfapyridine

concentration of 5 mg per 100 cc, and the population then remained static for forty-eight hours or longer (Fig 1) In some cultures, even with sulfa-

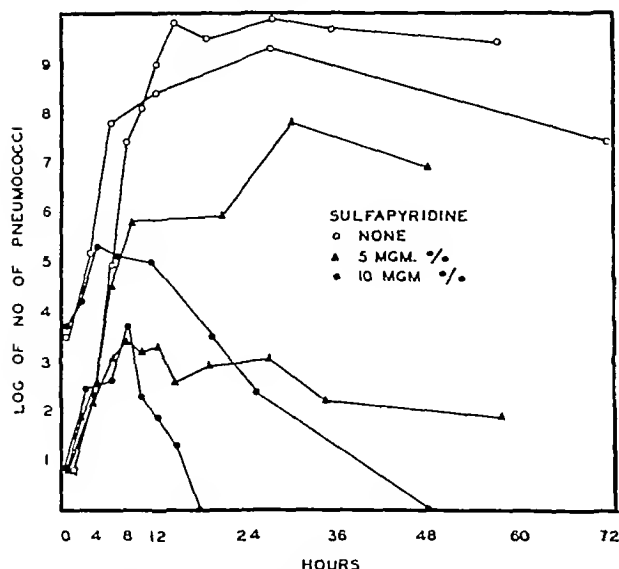


FIGURE 1 *Growth of Type 3 Pneumococci in Fresh Normal Defibrinated Human Blood That Lacked Pneumococidal Properties*

pyridine concentrations of 10 mg per 100 cc., the decline in bacterial population of the culture stopped after about twenty-four hours, and was followed first by a static phase and then by a second growth phase. The latter phenomenon may have been due to the development of sulfapyridine-fast variants within the culture,⁶ although this was not determined.

The results were quite similar with all the strains used, although there were some variations in the rate of growth and in the maximum populations attained, particularly with recently isolated strains. In every case bacteriostasis or killing of pneumococci attributable to sulfapyridine occurred only after multiplication of bacteria had taken place in the presence of the drug. Exposure of the bacterial cultures at a temperature of 5°C during any phase resulted in a suspension of growth and of sulfapyridine action, and these activities were resumed apparently unaltered when the culture was again incubated at 37°C. At 27°C growth, stasis and killing were slower than at 37°C. At 40°C the activity was approximately the same as at 37°C for forty-eight hours. Peptone, 2 per cent, in the medium had no significant effect on the sulfapyridine action. Soluble specific substance sufficient to inhibit the pneumococidal action of large amounts of the homologous antibody did not interfere with the bacteriostatic or bactericidal action of sulfapyridine.

Tests were also carried out with sulfanilamide and sulfapyridine in fresh defibrinated blood from patients with pneumococcus Types 1, 3 and 5 pneu-

monias, when such blood lacked pneumococidal action against the homologous pneumococcus. In these bloods, sulfanilamide in concentrations of 5 mg per 100 cc or higher inhibited the free growth of moderate numbers of pneumococci. Complete sterilization of the blood with sulfanilamide occurred infrequently, and then only with small original inoculums and with concentrations of 20 mg per 100 cc. The latter action was duplicated by sulfapyridine in concentrations of 5 mg per 100 cc or even less. With 7.5 mg per 100 cc or more of sulfapyridine, free growth was inhibited when as many as 100,000 or 1,000,000 pneumococci were inoculated in 0.5 cc. of blood, and no organisms could be grown in subcultures made at forty-eight hours when 1000 or even 10,000 diplococci were inoculated in the same amount of blood.

Type-specific antibody contained in therapeutic horse and rabbit serums induced marked pneumococidal action in the blood of the pneumonia patients. The combined action of small concentrations of sulfapyridine (25 mg per 100 cc.) and small amounts of the specific antiserums produce greater pneumococidal action than that occurring when the same amount of either of these agents was used separately.

In studying the bactericidal action of human blood it was found possible to distinguish between

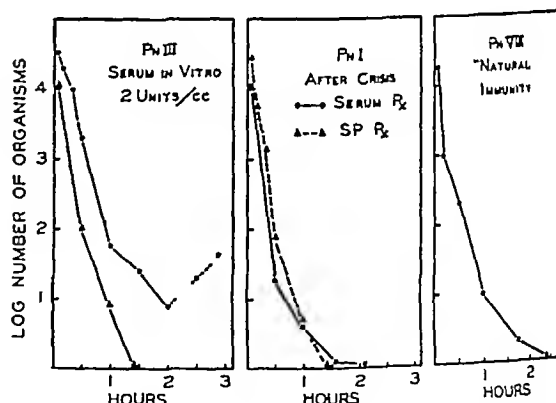


FIGURE 2 *Pneumococidal Action of Freshly Shed Fibrinated Human Blood, Incubated at 37°C*

In the first panel, the two curves represent separate tests. In the second panel, the curves represent tests with serums from two different patients, one who had serum therapy and the other sulfapyridine therapy.

the action due to the drug and that due to immune substances—both the so-called “natural” antibody or the antibody acquired either actively as a result of the infection or passively following serum injections. Pneumococidal action due to immune bodies occurred rapidly and was usually carried to completion within two or three hours (Fig 2). During this time the static phase of sulfapyridine

action is not yet reached and organisms are still multiplying in the absence of an immune mechanism (Fig 1)

These findings may be interpreted as indicating that both specific antibody and sulfapyridine have important but entirely distinct modes of action. The former has been shown to require an adequate number of intact phagocytic cells and also a heat labile serum factor (complement)², the latter does not require the mediation of serologic or cellular elements. In addition, the action of serum is rapid and is carried to completion, at least in vitro, before active growth in the presence of sulfapyridine is expected to cease. It seems reasonable that if both these mechanisms could be brought into play in the patient undergoing treatment for pneumonia, their actions might supplement one another and prove of great benefit, particularly to the heavily infected patient.

Antibody Response of Sulfapyridine Treated Patients³

Tests for bactericidal action, opsonins, mouse protective antibodies and agglutinins for the homologous type of pneumococcus were carried out with the blood of patients taken before, during and after treatment with sulfapyridine. Some of these patients also received specific serums at varying intervals after treatment with the drug had been begun. A considerable number of patients had varying amounts of pneumococidal power in their bloods before any treatment was given, but mouse protective antibodies were rarely found and agglutinins were not demonstrated at this time.

During sulfapyridine treatment, the blood of patients showed marked bacteriostatic and considerable bactericidal action on the homologous type of pneumococcus. This action was independent of the immune mechanism, and was the same as that induced by comparable concentrations of sulfapyridine when added to artificial mediums or to human blood in vitro. By doing bacterial counts in the blood two or three hours after inoculation, it was possible to differentiate pneumococidal action due to the drug and that due to antibody—whether natural,⁴ spontaneously acquired or passively introduced by therapeutic serums. Only antibodies gave rise to pneumococcus killing within two or three hours. The greatest and most rapid pneumococidal action occurred in the presence of heat stable antibodies (agglutinins, mouse protective antibodies, opsonins). Such antibodies appeared at about the same time that they would be expected to develop in patients who recover spontaneously. Protective antibodies rarely developed before the sixth day and agglutinins rarely appeared before the seventh day of the disease, irrespective of the time when the fever and pulse rate returned to

normal. When specific serum was given intravenously, a balance of all the antibodies measured was established and readily maintained in the circulating blood.

These findings again suggested that the combination of specific antibody and sulfapyridine was the most advantageous therapy in cases of pneumococcal pneumonia.

Fate of Sulfapyridine and Related Compounds in the Body

These studies were carried out in collaboration with Dr F H L. Taylor and his associates, at the Thorndike Memorial Laboratory. They included determinations of the concentration of the drug in the blood, and in some cases in the body fluids, of patients under treatment with sulfapyridine orally or with its sodium salt intravenously, similar and more detailed studies following the administration of single doses of sulfapyridine and of related compounds given by various feasible routes, a study of the distribution of these drugs between serum and red blood cells, and their distribution in the body fluids and organs in patients who died during treatment.

The absorption, excretion and degree of acetylation of sulfapyridine varied widely in different patients receiving the same dose of the drug.⁵ Such factors as fever, body weight, water exchange, vomiting, toxemia, nutritional deficiency states and impairment of renal function may have accounted for some of the variations observed, but many of them could not be explained. Nitrogen retention and other evidences of renal failure were most regularly associated with high levels of sulfapyridine in the blood and delayed excretion in the urine. This was usually, but not regularly, associated with a high percentage of acetylated drug in the blood. More than 60 per cent of the ingested drug was recovered from the urine in orally treated cases. The proportion excreted as the unconjugated drug varied considerably.

After a single oral dose of sulfapyridine, the maximum blood concentration was reached in about six hours, and the levels thereafter declined somewhat more slowly than they did when the intravenous route was used. About 80 per cent of the drug was recovered in the urine, excretion continuing for about five days. About half the amount was excreted in the first twenty four hours, and about 75 per cent of the chemical in the urine was in the acetylated form.

It was possible to establish and maintain satisfactory concentrations of sulfapyridine in the blood by the intravenous injection of its sodium salt, either exclusively or as a supplement to oral therapy. When a single dose of sodium sulfapyridine was given intravenously, the maximum concentra-

tion was attained in the blood at the end of the injection. At this time almost all the drug was circulating as free (unconjugated) sulfapyridine. The concentration in the blood declined rapidly at first and then more slowly. The percentage of drug circulating in the conjugated form increased steadily, so that little or no free sulfapyridine was detectable in the blood after twenty-four hours, while appreciable amounts of the acetylated drug could be found during the next twenty-four hours or even longer. The drug appeared rapidly in the urine. The specimens voided during the injection contained a small percentage of drug as acetylated sulfapyridine, and later ones contained increasing proportions of the chemical in this form. More than 60 per cent of the drug was excreted in the urine within twenty-four hours, but the excretion continued for about ninety-six hours, during which time about 90 per cent of the amount injected was recovered. Of the amount excreted, about 75 per cent was acetylated. The drug was excreted rapidly into the stomach and appeared in the gastric contents in greater concentrations than in the blood. Its appearance in the spinal fluid was somewhat delayed, reaching about half the blood concentration in one to three hours after the intravenous injection.

Sulfapyridine is relatively insoluble, but it was possible to get considerable amounts of the drug into complete and stable solution in 50 per cent glucose. This required boiling for a few minutes, when apparently a new compound was formed. Such a solution, containing the equivalent of 10 per cent sulfapyridine, could be given intravenously, subcutaneously (when diluted to the isotonicity of glucose) and orally without untoward effects. After the intravenous injection of this glucose sulfapyridine solution the initial concentrations of drug in the blood were higher than those after the injection of equivalent amounts of sodium salt. It was also eliminated much more rapidly, so that it could not be detected in the blood after twelve hours and very little was found in the urine after twenty-four hours. It was also eliminated much more rapidly after subcutaneous injection than were equivalent amounts of sulfanilamide. *When used in vitro, however, or after its parenteral administration, this glucose sulfapyridine solution was found to be essentially inert in bactericidal tests*⁸. Oral administration of glucose sulfapyridine resulted in markedly delayed absorption, the maximum blood levels being attained after twenty-four to thirty-six hours. The drug found in the blood after its oral administration was found to be active in bactericidal tests.*

Blake's solution made by adding 2 gm. of sulfapyridine to 500 cc. of 5 per cent glucose which has been brought to a boil and then adding 500 cc. of physiological saline retains sulfapyridine activity provided that it is not boiled after the drug is added.

Sulfapyridine was found to distribute itself rapidly and uniformly between serum and blood cells. This was true when it was added *in vitro*, after oral administration or after the intravenous injection of its sodium salt. Sulfanilamide, as also shown by Sise,¹⁰ was found in slightly greater concentration in the red blood cells than in the serum under these circumstances. Glucose sulfapyridine, when added to blood *in vitro* or when found in blood after parenteral administration, failed to enter the blood cells and could be recovered entirely from the serum. In the body, the glucose sulfapyridine was distributed only in the extracellular fluid, whereas sulfapyridine and sulfanilamide were distributed throughout the total body water. The renal clearance of these compounds indicated considerable reabsorption of sulfanilamide and sulfapyridine by the tubules, but there was no reabsorption after glucose sulfapyridine was given parenterally. Glucose sulfapyridine given orally behaved like sulfapyridine except for delayed absorption.

In the course of therapy the concentrations of sulfapyridine, both free and conjugated, were always found to be lower in pleural exudates and in cerebrospinal fluids than in the blood taken at the same time. Spinal-fluid levels were relatively lower than pleural-fluid levels. We also had an opportunity to study the concentration of sulfapyridine and sulfanilamide in various body fluids and organs of patients who died while under treatment with this drug. None of the patients had crystals or concretions in the urinary tract. The results indicated a more or less uniform distribution of the drugs in most organs. The brain and spinal fluid had lower concentrations than did the blood. There was marked concentration of drug, particularly in the acetylated form, in the urine. In the kidneys of the sulfapyridine-treated cases the concentration of drug was two or more times as great as in the other organs. In the kidneys of the small number of sulfanilamide treated cases that were examined the concentration of drug recovered was about the same as that of the blood.¹¹ This difference between sulfanilamide and sulfapyridine may reflect an important difference in the way these two drugs are handled by the kidney.

CLINICAL RESULTS

At the Boston City Hospital from July 1, 1938 to July 1, 1939, there were 1037 patients over twelve years of age who had acute parenchymatous pulmonary infections associated with the finding of type-specific pneumococci. Concentrated anti-pneumococcus horse and rabbit serums were used in some of the cases throughout the season. Sulfapyridine was first used in the latter part of Oc-

tober, but only a limited supply of this drug was available for several weeks. Its use was limited at first to mild cases and to those with higher types of pneumococci or with mixed infection. Later the use of the drug was extended in an effort to determine its full range of effectiveness. Patients started on sulfapyridine therapy were later given serum if they did not tolerate the drug well or if the response was not satisfactory. The combination of serum and sulfapyridine was used in some of the severest cases, treatment with these agents was started simultaneously in some cases

specific serums, have been studied in a more or less uniform manner in this hospital for several years and many of the data on these cases are available for comparison.¹² Only the more important facts brought out in this study can be summarized here. The detailed analysis is presented elsewhere.¹

Mortality in Relation to the Incidence of Important Prognostic Factors

The serum-treated cases had the lowest death rate (Table 1). As compared with the cases treated

TABLE 1 *Incidence of the Important Prognostic Factors in Cases of Pneumococcal Pneumonia and Their Effect on the Mortality (July 1 1938 to July 1 1939)*

| DATA | TYPE OF THERAPY | | | | ALL CASES |
|---------------------------------------|-----------------|-------------------------|---------------|----------------------------|-----------|
| | SERUM | SERUM AND SULFAPYRIDINE | SULFAPYRIDINE | NO SERUM, NO SULFAPYRIDINE | |
| Number of cases. | 211 | 129 | 225 | 472 | 1037 |
| Incidence | % | % | % | % | % |
| Bacteremia | 28 | 57 | 23 | 7 | 22 |
| Forty years of age or over | 39 | 68 | 65 | 62 | 55 |
| Sixty years of age or over | 7 | 29 | 32 | 30 | 25 |
| More than one lobe involved | 25 | 58 | 32 | 40 | 37 |
| Atypical pneumonia | 6 | 10 | 26 | 66 | 38 |
| Secondary pneumonia | 10 | 9 | 17 | 41 | 25 |
| Treatment 3rd day or earlier | 43 | 37 | 28 | 51 | 43 |
| Treatment 7th day or later | 10 | 22 | 25 | 29 | 33 |
| Mortality | | | | | |
| All cases | 13.3 | 24.0 | 17.8 | 28.6 | 22.6 |
| Nonbacteremic cases | 5 | 6 | 12 | 25 | 17 |
| Bacteremic cases | 36 | 37 | 38 | 90 | 44 |
| Under 40 years of age | 6 | 21 | 13 | 9 | 10 |
| Forty to 59 years of age | 19 | 24 | 14 | 23 | 20 |
| Sixty years of age or over | 47 | 27 | 29 | 59 | 47 |
| Only one lobe involved | 8 | 17 | 7 | 15 | 11 |
| Two or more lobes involved | 30 | 29 | 40 | 50 | 41 |
| Lobar pneumonia | 13 | 23 | 14 | 21 | 17 |
| Atypical pneumonia (bronchopneumonia) | 23 | 31 | 27 | 33 | 32 |
| Primary pneumonia | 11 | 23 | 13 | 16 | 14 |
| Secondary pneumonia | 38 | 36 | 39 | 52 | 48 |
| Treatment begun: | | | | | |
| Third day or earlier | 5 | 13 | 11 | 32 | 20 |
| Fourth day | 10 | 7 | 12 | 10 | 10 |
| Fifth day | 15 | 26 | 17 | 18 | 18 |
| Sixth day | 33 | 39 | 10 | 10 | 20 |
| Seventh day or later | 27 | 45 | 34 | 29 | 33 |

and consecutively in others. No attempt was made to carry out any strictly controlled alternation, since previous experience has convinced us of the futility of such attempts when therapeutic agents with known lifesaving properties are available. A large proportion of the cases received neither serum nor sulfapyridine. These included mild cases, some which were admitted late in the disease, others in which the diagnosis was first made at autopsy, and many in which the pneumonia complicated other serious illnesses (secondary pneumonias). Sulfanilamide was used in the treatment of some of the latter group and also in a few patients who received serum, but the effect of this drug was not enough to warrant separate consideration. All the 1037 cases were chosen for analysis since similar cases, treated with or without

with sulfapyridine alone, those receiving serum alone included more bacteremic cases, but in most other respects they formed a more favorable group. More of the serum recipients were treated early, fewer had multilobar involvement or atypical or secondary pneumonias, and the percentage of cases in the older age groups was lower.

The higher death rate among the cases treated with the combination of serum and sulfapyridine is somewhat deceptive. This group included the greatest proportion of cases which, among the typical primary pneumonias, had the worst prognosis. Bacteremia and multiple lobe involvement were twice as frequent as among the cases treated with either serum or sulfapyridine alone. Either of these factors alone is enough to account for the high death rate. Furthermore, many of the cases

are included in this group because they were showing no apparent benefit from treatment with one of these remedies at the time when treatment with the second agent was started

The mortality in the cases which received neither serum nor sulfapyridine was lower than in previous years¹² This was due in large measure to the fact that severe typical cases, when recognized, were promptly treated, leaving a group of cases with more atypical and relatively milder infections, as indicated by the low incidence of bacteremia

Considering these data alone, it is fair to say that the combination of serum and sulfapyridine was the most effective treatment in the worst cases and that, taking the cases as a whole and considering the important prognostic factors, no definite superiority was demonstrated for the one agent over the other when used separately It seemed necessary, therefore, to determine if possible whether there were any special conditions in which treatment with serum or sulfapyridine, or both, was most advantageous The more detailed analyses of the cases¹ brought out a number of such conditions, some of which may be mentioned briefly

Types of pneumococci Sulfapyridine was apparently effective against all types of pneumococci In some Type 2 and Type 5 cases, particularly the former, the response to treatment with sulfapyridine alone seemed less striking than that in other types, and the combination of serum with the drug gave the best results In Type 3 cases serum alone did not seem to be effective except in the milder cases, and in these sulfapyridine was equally effective The drug was most effective in the severe cases, but a more rapid recovery occurred if it was used in combination with serum Six bacteremic Type 3 patients recovered during the season All received sulfapyridine and one received serum in addition Sulfapyridine was most advantageous in the nonbacteremic cases associated with the higher types of pneumococci, particularly when sputum was the only source of pneumococci This was especially true when the specimens examined were not entirely satisfactory, when the number of pneumococci were few or when multiple pneumococcal types or large numbers of other organisms were found

Bacteremia The mortality in all the bacteremic cases appeared to be the same, regardless of whether serum or drug or both were used There were two conditions, however, in which the combination of serum and sulfapyridine was definitely superior in the presence of bacteremia, namely, when it occurred in patients over fifty years of age, and when the cultures yielded twenty-five or more colonies per cubic centimeter of blood These, of

course, are the cases with the gravest prognosis.

During this period, as in previous years, bacteremia rarely developed or persisted once serum treatment was instituted, except in cases with a severe focal purulent complication or with endocarditis. Although this was also true in general for cases treated with sulfapyridine alone, several patients had positive blood cultures up to twenty four hours or even longer after drug treatment was begun In some of the latter cases, the cultures made before treatment with the drug was started were sterile.

Age In the present cases, as in those previously reported,⁸ specific serum alone did not seem to influence greatly the mortality in the oldest age groups, that is in patients over sixty years of age In this group, sulfapyridine was apparently effective alone in the milder nonbacteremic cases, particularly in those due to the higher types of pneumococci As already noted, the combination of serum and the drug was the most effective in the older patients with bacteremia

Time of beginning treatment Serum, with or without sulfapyridine, was the most effective therapy when treatment was begun early, that is on or before the fourth day Sulfapyridine was apparently more effective than serum if treatment was begun on the fifth or sixth day To be sure, the figures, as shown in Table 1, are somewhat deceptive, since a number of the patients who were started on sulfapyridine therapy on the fifth and sixth days and failed to show a satisfactory response were later given serum, and thus were taken out of the sulfapyridine-treated group and included among cases treated with serum and drug The cases treated after the sixth day had a lower death rate and a more rapid recovery if serum was given, with or without sulfapyridine, particularly if the blood culture was positive before treatment was begun Whenever the combination of serum and drug was used, the best results were obtained when treatment with both was begun simultaneously or when serum treatment was begun within twelve hours after the first dose of drug was given.

Extent of lung involvement If the pneumonia had already extended to involve more than one lobe at the time therapy was started, the combination of serum and sulfapyridine was the most effective therapy This was true both in bacteremic and nonbacteremic cases

Atypical pneumonias and secondary pneumonias Such cases, when due to pneumococci, have usually had higher death rates than have cases of typical primary lobar pneumonia, in spite of a higher incidence of bacteremia in the latter groups¹³ In the present series, the results of therapy in the atypical pneumonias and in those complicating other serious

illness (secondary pneumonias) were not very satisfactory regardless of the treatment used.

Duration of Acute Illness

The duration of fever, elevated pulse rate and other symptoms of the acute pulmonary infection after the beginning of treatment was twice as long in the cases receiving sulfapyridine alone as in those treated with serum, regardless of whether they received sulfapyridine in addition. This was especially true in the bacteremic cases which recovered. In such cases the average duration of fever after the first dose of serum was about twenty hours, as compared with fifty hours after the first dose of sulfapyridine when used without serum. In general, the subjective and objective improvement which followed the drop in fever was striking when serum was used, whereas patients receiving sulfapyridine continued to feel depressed and ill for some time after the fever and pulse rate had reached normal. Rusty sputum was frequently raised after this time, and the pulmonary lesion extended in some cases while the drug therapy still was being maintained.

Complications

Septic focal complications were relatively most frequent among the patients treated with both serum and sulfapyridine. This was to be expected from the higher incidence of bacteremia in this group.¹² Only a few of the more significant facts need be mentioned. Empyema was demonstrated in 9 patients treated with serum alone and in the same number treated only with sulfapyridine—an incidence of about 4 per cent in each group. There were 2 deaths among each of these 9 cases. Five of the serum-treated and 3 of the sulfapyridine-treated patients who developed empyema had positive blood cultures before treatment was begun. Among the patients who received both serum and sulfapyridine, 12 (9 per cent) developed empyema, all had positive blood cultures before treatment, and 5 died. There were 7 with empyema among the patients who received neither serum nor sulfapyridine. None of them had positive blood cultures, and 3 died. In each of the four groups, only 1 patient among those who recovered was successfully treated by repeated thoracenteses alone; the others all required surgical drainage (closed thoracotomy or rib resection).

It is also of interest that 2 patients with fibrinous pericarditis recovered. Both received serum and 1 received sulfapyridine in addition. In 1 patient treated with sulfapyridine alone, purulent meningitis apparently developed during the course of treatment. Severe secondary hemolytic streptococcus infections, usually with organisms recovered

from the blood, were relatively frequent, but less so in patients treated with sulfapyridine alone. Early relapse was not frequent. This occurred about as often in the serum-treated patients (3 cases with 2 deaths) as in those treated with sulfapyridine alone (4 cases with 1 death). The same type of pneumococcus was recovered on admission and during relapse in each of the latter cases, and different types were found in each of the serum-treated cases.

Dosage

Serum was given intravenously in divided doses, the total amount being estimated according to the type of pneumococcus, the age of the patient and the severity of the disease. The average total amount per patient was 182,000 units in those treated with serum alone, and 253,000 units in those who received sulfapyridine in addition. No attempt was made to determine the smallest effective dose, so that large excesses were usually given, particularly in bacteremic cases. The amount of antibody per patient was smaller with rabbit serums than with horse serums, although a severer group of cases was chosen for treatment with the former. The average concentration of antibodies in the rabbit serums was about twice as great as in the horse serums, so that considerably smaller volumes were necessary when the former were used.

The dosage of sulfapyridine used averaged 20 gm per patient, given over a period of about three and a half days. This was the same whether or not serum was used in addition. However, smaller total doses of the drug were used more frequently in conjunction with serum treatment. In general, each patient was given an initial dose of 2 gm. and then 1 gm. every four hours, this was continued, whenever feasible, until the acute infection seemed to be overcome, usually about forty eight hours after the temperature and pulse rate returned to normal. Severely ill patients received a second dose of 2 gm two hours after the first dose. In occasional patients the treatment was begun with an intravenous injection of the soluble sodium salt, 4 or 5 gm being given in normal saline, either in a 5 per cent solution given in ten to fifteen minutes or in 1 per cent solution, taking about an hour for the injection. Some of the patients received a second injection of the same or smaller amount after four or five hours.³

Untoward Effects

Serum reactions of the usual types were encountered but rarely were severe. With rabbit serums, chills were slightly more frequent than they were with horse serums, but immediate allergic re-

actions were much less frequent and serum sickness occurred somewhat less frequently with the former. There was a marked variation in the chill-producing properties of different lots of serum from the same laboratory, but greater differences were noted among the serums from different laboratories.

The toxic effects attributable to sulfapyridine were about the same as those reported from other clinics. Nausea and vomiting were most frequent and occurred in about two thirds of the patients. Anemia, acute and delayed, leukopenia occurring early in the course of treatment, hematuria, nitrogen retention, mental depression or marked excitement, morbilliform eruptions and drug fever were observed, but were all relatively infrequent. The renal complications were sometimes serious. Nausea and vomiting and chills sometimes occurred during or after intravenous injections of the sodium salt. One patient with incipient delirium tremens may have died as a result of a convulsive seizure followed by coma and respiratory failure that began during an intravenous injection.

Sulfanilamide

Sulfanilamide in full dosage was used in the treatment of the acute pneumonia in 106 cases. Of these, 72 received no other specific therapy and 34 received serum in addition. There were 20 deaths among the former and 12 among the latter. Only 7 of the former patients had positive blood cultures and 6 of them died, while 14 of those who also received serum had positive blood cultures and 10 of them died. Dramatic recoveries attributable to sulfanilamide, comparable to those observed under sulfapyridine therapy, were rare.

COMMENT

It is sometimes hazardous to translate, in terms of the patient ill with pneumonia, the results of experiments made with the pneumococcus in vitro or in laboratory animals. Nevertheless, the results of the laboratory studies that have been summarized here, if they are of any significance in the human disease, suggest that in general the optimum therapy for pneumococcal pneumonia should include both specific serum and sulfapyridine. When considered in conjunction with the various factors in the host and in the invading organism, the laboratory findings have helped us interpret many of the clinical results observed in individual cases and in certain groups of cases. We may cite, as an example, the treatment of aged individuals with pneumonia.

In old patients it is necessary to use the greatest caution with both serums and drugs, since the indiscriminate use of either agent may prove seriously detrimental, while the judicious use of both

may be expected to give the best results. Many patients over sixty years of age do not seem to tolerate sulfapyridine therapy, in the usual doses given, over the long period usually required in severe cases. Likewise, large doses of serums, particularly horse serums, may give rise to serious cardiovascular reactions other than those resulting from the ordinary chills or allergic reactions. Such patients, however, when seen early in the disease may have mild infections which respond rather rapidly to treatment with sulfapyridine alone. When this is true, the prolonged use of the drug, at least in full doses, is usually unnecessary, may be harmful and therefore should be avoided. In old patients under sulfapyridine treatment, kidney function is more readily impaired than it is in young patients, and the cerebral and gastrointestinal complications may prove much more serious. When the disease is moderate or severe and is definitely associated with a specific type of pneumococcus, comparatively small doses of the homologous antibody given after a few hours of drug therapy will frequently bring about rapid clinical improvement, making it possible to dispense with further drug therapy much sooner.

It appears from the analysis of the clinical data that specific antipneumococcus serums and sulfapyridine are both highly effective agents in the treatment of the pneumococcal pneumonias in adults and that, in the great majority of cases, they are probably equally effective. It is natural, under such circumstances, that the physician will choose sulfapyridine for the treatment of most of his cases since, in general, it is simpler to administer, is more widely effective and is less expensive than are the serums. The more detailed analysis of the results of treatment in various groups of cases indicated certain situations in which the combination of serum and sulfapyridine gave better results than did either agent alone. In general, these represent the cases with the worst prognosis and warrant the use of the combined therapy.

In any given case it may become desirable or necessary to give specific serums because the patient falls into one of the categories in which the combined therapy is most effective, because the toxic effects of the drug may interfere with its effective use or occasion undue discomfort, or because the infection may prove resistant to the action of the drug. The physician should therefore be prepared for this contingency by obtaining sputum for typing and blood for culture as soon as the clinical diagnosis of pneumonia is made or suspected. Sulfapyridine therapy may then be started before the results of these procedures become available, unless there is some reason for withholding the drug. If the patient falls into one of the groups

of severe cases, or is one in whom sulfapyridine therapy is considered undesirable, serum should be given as soon as the type is determined or the result of the blood culture becomes known. The immediate use of sulfapyridine makes possible a period of observation during which doubts concerning the severity of the infection can be resolved and evaluated, particularly while the results of the blood culture are being awaited. In any patient, serum may be used to advantage if twenty-four to thirty-six hours of drug therapy fails to bring about marked clinical improvement.

CONCLUSIONS

Both specific antipneumococcus serums and sulfapyridine are highly effective agents in the treatment of the pneumococcal pneumonias.

The results of laboratory studies suggest that the combination of serum and sulfapyridine represents the optimum therapy in pneumococcal infections.

An analysis of the clinical results of treatment with serum and sulfapyridine, used separately and in combination in adults with pneumococcal pneumonia, indicates that for the large majority of cases each of these two agents is about equally effective when used alone, and that for most of the cases with the worst prognosis the combination of serum and sulfapyridine is more effective than is either agent alone.

The cases in which the combined therapy was most effective included the following bacteremic patients, particularly those over fifty years of age, those in whom treatment was started late in the disease and the ones with blood cultures that yielded moderate or large numbers of pneumococci, patients in whom more than one lobe was involved, most patients over sixty years of age who had more than a mild infection, and pneumonias due to Types 2, 3 and possibly 5 pneumococci except the mild cases.

Since sulfapyridine has a wide range of effectiveness, is usually simple to administer and is relatively inexpensive, it is advisable to start treatment with this drug in every case of pneumonia as soon as the clinical diagnosis has been made, but only after blood has been taken for culture and every effort has been made to obtain sputum for typing. In the severe cases that fall into the categories enumerated, — and to these may be added

the pneumonias complicating pregnancy and the puerperium, — specific serum should be given as soon as the causative types have been determined or the results of the blood cultures have become known. In addition, patients in whom continued drug therapy may prove harmful are best treated with serum as soon as the type is known. They include patients with renal or hepatic disease and those with severe anemias or other blood dyscrasias. The establishment of a balance of antibodies will permit early withdrawal of the drug and thus minimize its ill effects.

In all other cases due to specific types of pneumococci serum should be used if there is no satisfactory response after twenty-four to thirty-six hours of drug therapy.

In cases treated early in the disease, serum may be preferred, particularly where the drug is not well tolerated because of the dramatic response so regularly obtained with comparatively small doses of serum and because prolonged therapy may be necessary to avoid relapse of the infection when the drug is used alone.

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In old patients it is necessary to use the greatest caution with both serums and drugs, since the indiscriminate use of either agent may prove seriously detrimental, while the judicious use of both

may be expected to give the best results. Many patients over sixty years of age do not seem to tolerate sulfapyridine therapy, in the usual doses given, over the long period usually required in severe cases. Likewise, large doses of serums, particularly horse serums, may give rise to serious cardiovascular reactions other than those resulting from the ordinary chills or allergic reactions. Such patients, however, when seen early in the disease may have mild infections which respond rather rapidly to treatment with sulfapyridine alone. When this is true, the prolonged use of the drug, at least in full doses, is usually unnecessary, may be harmful and therefore should be avoided. In old patients under sulfapyridine treatment, kidney function is more readily impaired than it is in young patients, and the cerebral and gastrointestinal complications may prove much more serious. When the disease is moderate or severe and is definitely associated with a specific type of pneumococcus, comparatively small doses of the homologous antibody given after a few hours of drug therapy will frequently bring about rapid clinical improvement, making it possible to dispense with further drug therapy much sooner.

It appears from the analysis of the clinical data that specific antipneumococcus serums and sulfapyridine are both highly effective agents in the treatment of the pneumococcal pneumonias in adults and that, in the great majority of cases, they are probably equally effective. It is natural, under such circumstances, that the physician will choose sulfapyridine for the treatment of most of his cases since, in general, it is simpler to administer, is more widely effective and is less expensive than are the serums. The more detailed analysis of the results of treatment in various groups of cases indicated certain situations in which the combination of serum and sulfapyridine gave better results than did either agent alone. In general, these represent the cases with the worst prognosis and warrant the use of the combined therapy.

In any given case it may become desirable or necessary to give specific serums because the patient falls into one of the categories in which the combined therapy is most effective, because the toxic effects of the drug may interfere with its effective use or occasion undue discomfort, or because the infection may prove resistant to the action of the drug. The physician should therefore be prepared for this contingency by obtaining sputum for typing and blood for culture as soon as the clinical diagnosis of pneumonia is made or suspected. Sulfapyridine therapy may then be started before the results of these procedures become available, unless there is some reason for withholding the drug. If the patient falls into one of the group

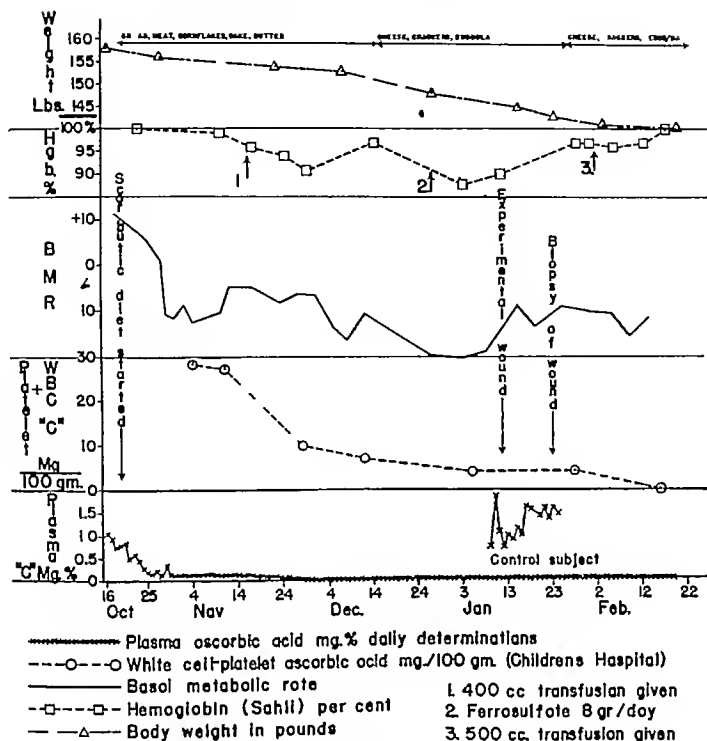


FIGURE 1

ADDITIONAL DATA.

Vitamin C Content of Plasma* (mg per 100 cc) (17)† 0.2 (23) 0.1 (41) 0.0 (55) 0.0 (79) 0.0 (87) 0.0 (100) 0.0 (121) 0.0
 Vitamin C Content of Whole Blood* (mg per 100 cc) (17) 0.2 (23) 0.1 (41) 0.1 (79) 0.1 (87) 0.0 (100) 0.0, (121) 0.0
 Red-Cell Count (millions) (0) 5.0, (5) 5.0 (12) 5.0 (23) 5.0, (29) donor for transfusion 400 cc (30) 4.6 (37) 4.2 (42) 4.5 (57) 4.8 (77) 4.3 (85) 4.5 (102) 5.0 (106) donor for transfusion 500 cc (110) 4.9 (122) 5.5
 White-Cell Count (thousands) (0) 4.7 (57) 4.8 (85) 4.5 (102) 4.2 (122) 4.8
 Differential White-Cell Count (per cent) (76) 70 P 26 L 2 M 1 E 1 B (90) 76 P 16 L 4 M 3 E 1 B
 Hematocrit (0) 0.48 (77) 0.50 (87) 0.49 (107) 0.45 (122) 0.45
 Mean Corpuscular Volume (cubic microns) (75) 110 (93) 112 (105) 89.7 (119) 83.8 (122) 82.3
 Sedimentation Rate (mm per minute) (28) 0.4 (75) 0.01 (93) 0.03 (111) 0.055
 Blood Sodium (mg per 100 cc) (33) 142 (43) 136 (78) 143 (89) 147 (122) 149
 Blood Complement (78) normal (121) normal
 Götthlin Test (36) negative (53) negative (67) negative (88) negative (105) negative (110) negative (120) negative
 Bleeding Time (Ivy seconds) (71) 124 (102) 290 (122) 190
 Clotting Time (Ivy minutes) (71) 9 (102) 8 (122) 12
 Guaiac Test on Stool (54) negative (95) negative (120) negative
 Urine (sugar albumin and sediment) (0) negative (54) negative (95) negative (120) negative
 Serum Protein (gru per 100 cc) (93) 6.5 A G as 4.3 2.2 (121) 5.0
 Glucose Tolerance (93) normal (122) normal.
 Chest X Ray (0) normal (46) normal (85) normal (112) normal.
 Electrocardiogram (35) normal (85) normal (112) normal.

Determinations at the Childrens Hospital (Boston) Laboratory
 †Numbers in parentheses refer to days of diet.

this clinical finding is coupled with the experimental work, particularly that of Lanman and Ingalls,¹⁹ the possible inference is obvious in surgical patients the vitamin C is withdrawn from the blood postoperatively in order to be utilized in the process of wound healing. And if this inference is coupled with the belief that a plasma level of ascorbic acid of below 0.5 mg per 100 cc in adults is dangerously low, the conclusion must be that anyone with a vitamin C level below this figure is apt to have poor wound healing or dehiscence, even in the absence of other complicating factors. Such an inference would seem to conflict with the facts, since, before any great attention had been focused on vitamin C, the incidence of poor wound healing in a large series of abdominal cases dropped from 4.3 to 1.2 per cent when care was taken to use modern methods of suturing and to exercise gentleness in handling the tissues.²² Moreover, Lund²¹ has reported a large group of patients with known low plasma vitamin C levels who nevertheless showed perfectly normal wound healing. These findings do not support the suggestion that high plasma vitamin C levels are essential to proper wound healing in the average surgical patient. Do multiple avitaminoses, growth factors and infections play a role in the frequent cases of clinical and subclinical scurvy and its complications reported in the literature? Are these factors partly responsible for the widespread belief that plasma levels of ascorbic acid below 0.5 mg per 100 cc are dangerously low? Are plasma levels of ascorbic acid a good index of the vitamin C status of the adult? These questions led to the following experiment.

J. H. C., a normal 27-year-old man, weighing 158 pounds, with negative history, physical examination and laboratory findings, placed himself on a vitamin C-free diet supplemented by vitamins A, B, D, G and later E. During the entire experiment he remained active, carrying out his assigned duties as assistant resident surgeon in a large general hospital.

For the first 2 months the diet consisted of well-cooked meat, not over 200 gm per day, bread, butter (not over 30 gm. per day), cake (containing no fruit or fruit flavoring), corn flakes, polished rice and coffee, small amounts of cream (not over 30 cc. per day) being allowed for coffee and cereal. For the next 6 weeks the diet consisted of Swiss and American cheese (not over 240 gm per day), crackers, black coffee, beer (not over 1500 cc. per week) and a semi-sweet chocolate candy bar, a standard brand which, according to the makers, consists only of chocolate bean, roasted and then processed at 200°F for 72 hours, and sugar. This latter diet was thereafter supplemented with 2 eggs per day. There was no deviation from the dietary regimen at any time.

Daily plasma vitamin C determinations were done by the macro-method of Mindlin and Butler¹⁰ using the Evelyn photoelectric colorimeter,²³ with correction for turbidity as suggested by Bessey.⁸ At first the samples of blood were collected in cyanide according to the method

of Pijoan and Klemperer,¹¹ but this method was later discarded, oxalate alone being used. Determinations were always made as soon as the blood had been withdrawn. During the entire period, frequent control determinations were made. The results of all determinations are represented in Figure 1.

During the entire dietary period frequent capillary fragility tests, according to the technic described by Göthlin,² and other laboratory procedures (*vide infra*) were carried out.

After 85 days of vitamin C-free diet, and after the plasma vitamin C had been zero for at least 44 days, an experimental wound consisting of a 6-cm transverse incision was made in the right midback, being carried down



FIGURE 2 Biopsy Specimen from Subject

In this section the dark-staining old connective tissue is seen in the lower left hand corner, there is an abundance of capillaries and collagen. Connective-tissue stain ($\times 170$).

through the latissimus dorsi muscle and the anterior spinalis fascia. Several small bleeders were ligated with plain No. 00 catgut. Approximately 2 gm. of the spinalis muscle was removed for analysis, the deep fascia being then closed with interrupted plain No. 00 catgut sutures, a few of the same being placed also in the superficial fascia. The skin was closed with multiple interrupted silk sutures. A wound of similar proportions was made simultaneously in a normal adult male control whose plasma ascorbic acid levels had been high, and who remained on a diet high in vitamin C throughout the experiment. Twenty-four hours preoperatively the control was given 200 mg of ascorbic acid by mouth, and a plasma determination was done 30 minutes later. The result

high value may partially account for the sharp postoperative drop apparent in the chart.

The biopsied specimens of sacrospinalis muscle were analyzed by Dr O. A. Bessey of the Harvard Medical School, who could find no vitamin C in the muscle of the subject, although there was an appreciable amount in that of the control. Although the possibility exists that some of the ascorbic acid present in the former specimen was oxidized by small amounts of blood present, Bessey considered the difference between the two samples significant since this factor of oxidation was present in each.

The activities of neither the subject nor the control were



FIGURE 3 Biopsy Specimen from Subject.

This section shows numerous capillaries and an abundance of intercellular substance in the granulation tissue. Fibroglia fibers and a mitotic figure should be noted. Eosin and methylene blue stain ($\times 400$).

restricted postoperatively and their courses were uneventful except for a slight elevation of temperature on the 1st day (subject, 99.6 F control 99.4 F). On the 6th postoperative day the sutures were removed both wounds being clean. On the 11th postoperative day sizable specimens were taken from the wounds of both the subject and the control, the incision being carried down to the extreme depth of the previous one and transversely to it. Sections of these specimens showed no appreciable difference between the granulations of the subject and of the control. Not only excellent proliferation of fibroblasts but also ample intercellular substance and capillary formation could be seen in the granulation tissue of the vitamin C deficient subject. Healing of the wounds was uneventful in each case.

DISCUSSION

Inspection of the chart will reveal that the plasma ascorbic acid concentration fell rather rapidly during the first eleven days of the diet, and then remained between 0.14 and 0.0 mg per 100 cc. for approximately twenty-eight days. Thereafter the values remained so close to 0.0 mg that they may be considered as such, particularly since they check with those determined at the Children's Hospital.

Butler and Cushman,²⁰ who believe the ascorbic acid levels in the white cells and platelets to be a much better index of vitamin C deficiency than are the plasma levels, made such analyses for us by a technic recently developed in their laboratory, and found a gradual drop in the vitamin C level in the white-cell layer of centrifuged blood from 28.0 mg per 100 cc. on the seventeenth day to 4.0 mg on the eighty-second day and to 0.0 mg by the one hundred and twenty-second day of the diet (Fig 1). According to Butler and Cushman the values of 4 to 0 mg per 100 cc in the white cells and platelets are comparable with those found in scorbutic infants, the average normal level being 34 mg.

It is interesting that during the period of the experiment no sign or symptoms of scurvy developed. The lack of appreciable difference in the wound healing of the subject and of the control and the abundance of intercellular substance in the biopsied specimen of the deficient subject are consistent with these negative clinical findings. Also worthy of consideration, however, is the fact that no vitamin C was detected in the biopsied muscle of the deficient subject. This finding, in view of the ample intercellular substance in the healing wound, may be of importance, since some recent investigators,²¹ repeating the work of Wolbach and Howe,¹² have been unable to confirm the finding of lack of intercellular substance in scorbutic guinea pigs.

During the dietary period there was a moderate weight loss (18 pounds).

It will be seen on inspection of Figure 1 that the basal metabolic rate fell to -20 per cent between the sixty-ninth and eighty-second days of the diet, during which time the subject was on an intake of cheese and crackers and was losing weight. Since higher values were later obtained, we now believe these low metabolic rates were the result of inanition or diminished specific dynamic action of ingested protein or both.

A slight fall in the red-cell count and the hemoglobin, reaching a minimum around the beginning of the third month of diet, was rapidly corrected by the intake of 8 gr of ferrous sulfate daily, so that within two weeks the red-cell count had re-

turned to 5,000,000 and the hemoglobin to 97 per cent (determinations done at the Thorndike Memorial Laboratory) This is of some interest in view of the fact that the subject lost approximately 2300 cc of blood in total volume of specimens taken and two transfusions given during the experimental period

All other laboratory work—including the examination of stools and urine for blood and of blood smears, differential leukocyte counts, the determination of hematocrits, mean corpuscular volumes, hemoglobins, bleeding and clotting times, sedimentation rates, blood-complement, blood sodium, blood cholesterol, blood lipid, serum protein and albumin-globulin ratios, fasting blood sugar and sugar-tolerance tests, capillary fragility tests, chest x-rays and electrocardiograms—remained essentially normal

There was no increased fatigue on muscular exertion as measured by tests on an ergograph although subjectively there was a mild lassitude The gums remained in good condition

SUMMARY

A normal active adult placed himself on a vitamin-C-free diet supplemented by the other known vitamins Over a period of four months, during which the ascorbic acid content of the plasma, white cells and platelets fell to zero, no signs or symptoms of scurvy developed An experimental wound made after twelve weeks of the diet, when the plasma readings had been zero for at least forty-four days, showed good healing both grossly and microscopically when a biopsy specimen was taken eleven days later No lack of intercellular substance could be seen Analysis of the muscle removed showed no trace of ascorbic acid Except for the aforementioned changes in vitamin C concentrations, extensive clinical studies revealed only a transient fall in hemoglobin (reversed by iron) and a fall in basal metabolic rate and body weight

It is, of course, to be remembered that only a single case is reported, so that no positive conclusions can be reached We believe, however, that this study suggests the following

In the absence of multiple avitaminosis, infection or growth factor, a plasma ascorbic acid of below 0.5 mg per 100 cc. is not necessarily dangerously low

Plasma ascorbic acid levels are a poor index of clinical vitamin C deficiency in the adult. Rather, they probably indicate the degree of saturation, which should not be confused with deficiency

The apparent ascorbic acid content of the circulating white cells and platelets may fall to zero without the appearance of clinical scurvy in an adult on an adequate intake of vitamins other than vitamin C

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END RESULTS IN THE INJECTION TREATMENT OF
INGUINAL HERNIA*

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ABOUT three years ago there was considerable agitation throughout the country in regard to the injection treatment of inguinal hernia. The subject was widely discussed in the literature. One group of surgeons declared that here was a panacea with the aid of which one could obtain as high as 94 per cent of cures. This was in sharp contrast to the opinion of a more pessimistic group who stated that this procedure was of little or no value and that hernias so treated recurred in over 80 per cent of cases. As a result of this great divergence of opinion, we believed that we should make a clinical study in an attempt to evaluate this type of treatment. The chief fact that we wished to discover was the true percentage of recurrences after injection treatment. This study necessarily could not be completed in less than two or three years, because the figures would be of no value unless the end results were at least a year old.

At the beginning of our study the criteria for the acceptance of a case for treatment were rather broad, but as time went on we found that we were definitely limiting the group which we considered suitable. On the other hand, we accepted a considerable number of patients who were poor operative risks or gave poor prospects for cure under any form of treatment. We of course excluded patients with strangulated or incarcerated hernias, postoperative hernias and hernias that could not be completely reduced and properly held with a truss, as well as all patients with a general systemic disease that might contraindicate this type of treatment.

The objectives to be obtained in the cure of an inguinal hernia are the same whether treatment consists of surgery or of injection. These objectives are the obliteration of the sac and the sealing of the inguinal canal. Obviously the number of injections necessary must be discovered by trial and error. During the course of our study we found that the number given to any one individual was comparatively high. There is no question that the patient must be treated vigorously in the early stages. Early disappearance of the impulse in the inguinal canal and the firmness of

the muscles give false assurance, and the injections must be continued even after such conditions obtain, because there is sure to be a certain amount of subsequent relaxation as the inflammatory process subsides. We believe that the minimum number of injections should be twelve, and some of our cases received as many as eighteen or twenty.

The cases that we accepted as suitable and that were treated by the injection method were those of indirect inguinal hernia in which the sac did not exceed 4 cm in diameter and the external ring did not exceed 2 cm in diameter. We realize that the distinction between direct and indirect inguinal hernias cannot always be made with accuracy, but the correct diagnosis can be determined in the majority of cases. Undoubtedly we have included without knowing it a certain number of direct hernias, and this probably accounts for a certain number of recurrences, a fact which was, indeed, proved by operation in several cases. The inclusion of such hernias has made our end results appear worse than they really were, and the figures are therefore conservative. We have found obesity to be a definite contraindication because fat people are almost sure to develop recurrences.

We shall not discuss anatomy, histology or technic because these phases of the question have been amply covered by others writers. It is sufficient to say that for the purpose of this study we used the injection technic described by Rice,* and to simplify the study we used the same injection fluid on all cases (a 5 per cent solution of sodium psyllate put out under the trade name of Slynasol). The reason for selecting this solution was that it is relatively mild in action, can be given in doses of 3 cc. or more and does not have to be preceded by a local anesthetic. Not only did the absence of the local anesthetic simplify the technic, but also pain was an indication that the point of the needle was about to penetrate the peritoneal cavity.

Most patients made no complaint of pain following the injection but described only a sensation of soreness lasting from twenty four to forty-eight hours. One patient refused further treatment after three injections, on the ground that the pain was unbearable for two or three days after each injection. One patient was hospitalized because of sudden pain twelve hours after the fifth injection.

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He was admitted to the Emergency Ward with swelling and pain at the external ring, and was operated on under the mistaken diagnosis of strangulated hernia. The neck of the sac was completely obliterated and the canal was well sealed. The swelling and pain had been caused by an acute hydrocele of the cord, which presumably would have subsided if the operation had not been performed.

During the period of study we saw nearly all the patients with hernias who came to the Out Patient Department. We accepted about half these cases as suitable for injection treatment, and followed them, some as long as three years, for possible recurrence.

The question of recurrence is not always a simple one. We have classified as such any bulging subsequent to a course of treatment. It must be realized that this is an arbitrary definition, since there is no set time when treatment can be said to have been completed. The fact that a patient usually does not have a recurrence while still under treatment may explain the surprisingly small number of recurrences reported by some writers. For instance some patients developed a small recurrence several months after completing a course of injections, but were permanently cured after receiving a few more treatments. It has become increasingly clear that both the patient and the doctor must persist with the treatment, and that, if so, an increasingly higher percentage of cures will result, though we realize that the prolongation of treatment is one of the objections to this method. It is interesting that some of the patients were cured by less than twelve treatments. One remained cured for one and a half years after ten injections, another for two and a half years after eleven injections, and a third for two years after only six injections.

As regards the complications with this form of treatment, a few patients had mild pain for several hours, and a few had some swelling of the cord, in most cases painless. Rarely did we see a mild syncope that passed off within fifteen or twenty minutes. We have no knowledge of any nerve injury, sterility or impotence as a result of the treatment. We routinely examined the testicles before starting treatment, and noticed no atrophy after it had been completed. An occasional small hematoma occurred which required no treatment. Blood appeared in the syringe on a few occasions. The needle was promptly withdrawn and the injection was continued in a new location. In a few cases an annoying dermatitis developed from irritation caused by the truss, and 1 patient had to give up the treatment altogether because a severe dermatitis occurred whenever it was worn.

We found that the hernias recurring after injection

were much smaller than the original ones, and possibly we should have given further injections in these cases. In most cases we did not do so, but resorted to surgery, not wishing to subject the patient to the time and trouble of a new series of injections.

A number of those given palliative treatment were made much more comfortable, and although there was no hope of discarding the truss in some of these cases, it held the hernia much more effectively and comfortably after the injections. We believe that this method of treatment has a definite prophylactic value which must be considered in its evaluation.

Patients with potential hernias can certainly be benefited. Several patients applied to us for injections who had no real hernia but were kept from obtaining employment because of relaxed or enlarged rings. A few injections gave these patients complete relief.

Of 109 cases followed up, 32 (29 per cent) had recurrences. The longest time any patient was observed to remain cured was forty-two months, and the shortest two months, the average period being fourteen months. The elapsed time without recurrence since the last treatment was from a year to a year and a half in 68 cases, from a year and a half to two years in 38 cases and over two years in 19 cases.

The advantages of injection treatment are as follows: it is safe, the mortality rate being zero, there are no serious complications, and even the minor complications, such as pain, the puncturing of a blood vessel, induration of the cord and peritoneal irritation, are not serious, the patient remains ambulatory during the course of treatment, and does not suffer loss of time or pay or the expense of hospitalization. The chief disadvantages of the method are that it is prolonged, and that the recurrence rate is higher than one would expect following expert surgery.

CONCLUSIONS

We do not believe that the injection method is a cure-all for hernias, or that the physician should apply it to every hernia that he encounters. The selection of suitable cases is not easy, but as a result of our experience in this series we can now select them with greater accuracy, and under these conditions should be able to hold the recurrence rate to 25 per cent. In general the ideal patient is active, has good musculature, is not obese and has an indirect inguinal hernia of small or moderate size.

The technic of injection is exacting, and one must be able to visualize in detail the anatomy of the inguinal canal if the procedure is to be successfully carried out.

GRANULOCYTOPENIA FOLLOWING BARBITURATE THERAPY

Report of a Case

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FEW cases of granulocytopenia due to medication with the barbiturates have been reported. The following case is presented as an example.

CASE REPORT

M. L. M., a 30-year-old, unmarried woman was admitted to the Long Island Hospital April 28 1939. Except for an occasional attack of asthmatic bronchitis, she had been well until 5 days previous to admission, when she developed a sore throat, a nonproductive cough, fever, malaise, hoarseness and vomiting.

Physical examination showed reddening of the mucous membrane of the pharynx, palpable cervical nodes, hoarseness, and sibilant and sonorous rales throughout the chest. The white-cell count was 6500. The temperature which was 102 F. on admission fell promptly to 99 or 100. On May 5 the chest was clear and resonant, and the patient was asymptomatic save for a slight cough. During this period she had received glucose gargles, acetylsalicylic acid, ephedrine sulfate, syrup of hydriodic acid and ammonium chloride. An x-ray film of the chest showed no abnormality. The sputum was negative for tubercle bacilli. Urinalysis was essentially negative. A blood Wassermann test was negative.

On May 4 for insomnia the patient was given 1½ gr. pentobarbital sodium, but because of depression the next day it was discontinued. On May 5 one tablet of Allonal was given. Three hours later after a shivering chill the temperature was 102 F. The patient felt wretched, had a headache and could not sleep. On May 6 she was given 3 gr. Sodium Amytal and had a sound sleep without a "hangover." On May 7, 8 and 9 she received an Allonal tablet each night but did not sleep well. Because of pain over the left maxillary sinus a history of sinusitis and a persistent fever of 99 to 100 F., x-ray films of the sinuses were taken on May 9. They showed thickened membranes in both antrums but no fluid level. The patient was discharged May 11 with a normal temperature.

She felt well until May 19 when pain began in both submaxillary regions. Insomnia, headache, weakness and lassitude became marked. She took several aspirin tablets and two Allonal tablets on May 20. On May 21 she took more aspirin and another Allonal tablet. On May 22 at 1 a.m. her temperature was 101 F. and at 3.30 a.m. 103.4 after a shivering chill for 1 hour. She was readmitted to the hospital where examination showed only tender submaxillary nodes. The hemoglobin was 95 per cent, the red-cell count 4,500,000 and the white-cell count 1050 with 4 per cent neutrophils (band forms) 8 per cent myelocytes 80 per cent lymphocytes, 4 per cent monocytes and 4 per cent eosinophils. A few hours later the white-cell count was 2250 with a similar differential count. Table 1 shows the counts as they rose thereafter. Therapy consisted only of 0.5 cc. of Reucologen, a concentrated liver extract, administered intramuscularly once daily. The fever rapidly subsided. Coincident with an upper-respiratory infection there was a fall in the leukocyte and neutrophil counts after the original rise to normal, but recovery was spontaneous, since liver therapy

had been discontinued when the counts first reached normal.

The patient stated at this time that in 1936 following extraction of a tooth under novocain anesthesia, she had had local pain, adenopathy, sore throat, exhaustion and a fever of 101 F. and that she had been given some unidentified tablets. A low white-cell count, which she believed was 1200 was found. Other counts were taken and she was confined to a hospital, the records of which stated that her dentist had found a white-cell count of 3500 of which only 10 per cent were polymorphonuclears (band forms). Later blood studies at that hospital showed a hemoglobin of 81 per cent, a red-cell count of 4,620,000 and a white-cell count of 3000 with 16 per cent neutrophils (5 per cent band forms) 30 per cent lymphocytes 52 per cent monocytes and 2 per cent basophils. The temperature dropped rapidly to normal, and the patient was discharged with the diagnosis of mild agranulocytosis.

On the second admission to the Long Island Hospital the patient complained of pain at the angle of the right jaw from a known infected and impacted wisdom tooth. An x-ray film showed no abscess formation. On June 7 she was given 10 cc. of 1 per cent novocain subcutaneously to test for sensitivity. Since there was no change in the blood counts, on June 8 the tooth was extracted under novocain anesthesia. Following this there was a leukocytosis for about a week. The patient was discharged June 15.

After discharge frequent blood-cell counts were taken. These appear in Table 1. On July 5, patch tests were done with acetylsalicylic acid and acetphenetidin. Allonal and barbitals all were negative. Tests were then begun in order to determine whether a drug had caused the granulocytopenia. Allonal was suspected. On July 12, 13 and 14 doses of 5 gr. of acetylsalicylic acid were taken each day with no resultant leukopenia or neutropenia. On July 17, 18 and 20 doses of 5 gr. of acetphenetidin were taken each day with no subsequent leukopenia or neutropenia. On July 24 at bedtime, an Allonal tablet was taken. The next day both the white-cell count and the percentage of neutrophils had risen (7750 with 93 per cent neutrophils). The patient felt marked lassitude, weakness and slight dizziness. The following night she took another Allonal tablet. The next day she was near prostration and had to remain in bed most of the day. The white-cell count was 4350 with 51 per cent neutrophils. In 2 days the count had risen and she felt fairly well again. Since Allonal had produced this effect and since acetphenetidin had produced no effect, the alurate component seemed responsible. Alurate was not available, but sodium alurate was obtained in 3½ gr. capsules (equivalent to approximately 3 gr. of alurate). On August 1 the patient was given a third of the contents of one of these capsules on retiring. The next day the white-cell count was 5800 with 70 per cent neutrophils. The following night she took a similar quantity of sodium alurate, and the next day the white-cell count was 2800 with 63 per cent neutrophils. After the first dose of sodium alurate there was considerable lassitude and weakness after the second dose the pa-

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†Since January 1939 Allonal has been composed of alurate (1 gr.) and of acetphenetidin (3 gr.)

patient was prostrated. The white-cell count fell to 1800, with no neutrophils (Table 1). She remained weak and devoid of energy, the gums became sore, the submaxillary regions ached and the temperature gradually rose to 102°F on August 7. That night she had cold chills and sweats

was given 1 cc of Reticulogen intramuscularly, and later 10 cc of Pentnucleotide intramuscularly in the buttock. Within 1 minute after the Pentnucleotide injection she noticed dryness of the throat, asthma set in with labored breathing and wheezing, and there was marked numbness

TABLE 1 Summary of Data

| DATE (USUALLY AT 11 A.M.) | WHITE CELL COUNT | NEUTRO- PHILS % | LYMPHO- CYTES % | MONO- CYTES % | EOSINO- PHILS % | BASO- PHILS % | MYELO- CYTES % | REMARKS |
|---------------------------------|------------------------|-----------------------|-----------------------|---------------------|-----------------------|---------------------|----------------------|--|
| 5-22-39 9 a.m. | 1050 | 4 | 80 | 4 | 4 | | 8 | Hospitalized hemoglobin 95% red-cell count 4,500,000 |
| 5-22-39 4 p.m. | 2250 | 4 | 80 | 4 | 4 | | 8 | |
| 5-23-39 | 1650 | 16 | 60 | 3 | 4 | | 17 | |
| 5-24-39 | 2100 | 34 | 50 | 6 | 8 | | 2 | |
| 5-25-39 | 3250 | 40 | 46 | 4 | 2 | | 8 | 0.5 cc Reticulogen |
| 5-26-39 | 5100 | | | | | | | 0.5 cc Reticulogen |
| 5-27-39 | 5650 | | | | | | | 0.5 cc Reticulogen |
| 5-28-39 | 6050 | 68 | 29 | | 2 | | 1 | 0.5 cc Reticulogen |
| 5-29-39 | 5050 | | | | | | | |
| 5-30-39 | 4500 | | | | | | | Upper respiratory infection |
| 5-31-39 9 a.m. | 2500 | | | | | | | Upper respiratory infection |
| 5-31-39 4 p.m. | 2450 | 30 | 60 | 4 | 5 | 1 | | Upper respiratory infection |
| 6-1-39 | 2400 | | | | | | | Upper respiratory infection |
| 6-2-39 | 2350 | | | | | | | Upper respiratory infection |
| 6-3-39 | 3000 | | | | | | | |
| 6-4-39 | 2450 | | | | | | | |
| 6-5-39 | 3500 | | | | | | | |
| 6-6-39 | 5500 | | | | | | | |
| 6-7-39 | 6000 | | | | | | | 10 cc 1% novocain injected subcutaneously |
| 6-8-39 | 5700 | | | | | | | Tooth extracted, novocain anesthesia |
| 6-9-39 | 10050 | | | | | | | |
| 6-10-39 | 9450 | | | | | | | |
| 6-11-39 | 11100 | | | | | | | |
| 6-12-39 | 6050 | 68 | 25 | 3 | 2 | 1 | 1 | |
| 6-14-39 | 13150 | | | | | | | |
| 6-15-39 | 12400 | | | | | | | Discharged from hospital |
| 6-16-39 | 13250 | | | | | | | Catamenia June 15 to 18 |
| 6-17-39 | 9650 | | | | | | | |
| 6-18-39 | 9 000 | 65 | 24 | 3 | 8 | | | |
| 6-19-39 | 8200 | | | | | | | |
| 6-20-39 | 6750 | | | | | | | |
| 6-21-39 | 7500 | | | | | | | |
| 6-22-39 | 9900 | | | | | | | |
| 6-24-39 | 11050 | | | | | | | |
| 6-25-39 | 8500 | 81 | 14 | | 4 | 1 | | |
| 6-26-39 | 9500 | | | | | | | |
| 6-28-39 | 10650 | | | | | | | |
| 6-30-39 | 10800 | | | | | | | |
| 7-2-39 | 6500 | | | | | | | |
| 7-3-39 | 6900 | | | | | | | |
| 7-5-39 | 8350 | | | | | | | Patch tests done |
| 7-7-39 | 5500 | | | | | | | |
| 7-10-39 | 5200 | 71 | 23 | | 5 | 1 | | Catamenia July 8 to 11 |
| 7-11-39 | 5400 | 78 | 19 | 1 | 2 | | | |
| 7-12-39 9 a.m. | 5900 | | | | | | | 5 gr acetylsalicylic acid (0.3 gm) at 9 a.m. |
| 7-12-39 3 p.m. | 8250 | 67 | 23 | 6 | 3 | 1 | | |
| 7-13-39 | 8700 | 78 | 18 | 3 | 1 | | | 5 gr acetylsalicylic acid (0.3 gm) at 9 a.m. |
| 7-14-39 | 5800 | 69 | 22 | 5 | 4 | | | 5 gr acetylsalicylic acid (0.3 gm) at 9 a.m. |
| 7-17-39 10 a.m. | 5950 | 67 | 16 | 6 | 10 | 1 | | 5 gr acetphenetidin at 10 a.m. |
| 7-17-39 3 p.m. | 8000 | 72 | 23 | 4 | 1 | | | |
| 7-18-39 | 7500 | 73 | 19 | 3 | 3 | 2 | | 5 gr acetphenetidin at 10 a.m. |
| 7-20-39 | 7500 | 81 | 15 | 2 | 2 | | | 5 gr acetphenetidin at 10 a.m. |
| 7-24-39 | 5600 | 78 | 15 | 3 | 2 | 2 | | One Allonal tablet at 11 p.m. |
| 7-25-39 | 7750 | 93 | 6 | 1 | | | | One Allonal tablet at 11 p.m. |
| 7-26-39 | 4350 | 51 | 33 | 10 | 6 | | | |
| 7-27-39 | 4900 | 71 | 20 | 4 | 3 | 2 | | |
| 7-28-39 | 6000 | 79 | 11 | 4 | 6 | | | |
| 8-1-39 | 6750 | 74 | 17 | | 7 | 2 | | 1 gr sodium alurate at 11 p.m. |
| 8-2-39 | 5800 | 70 | 23 | | 5 | 2 | | 1 gr sodium alurate at 11 p.m. |
| 8-3-39 | 2800 | 63 | 26 | 1 | 8 | 2 | | Hemoglobin 80% red-cell count 4,300,000 |
| 8-4-39 | 1750 | 25 | 51 | 4 | 16 | 4 | | |
| 8-5-39 | 2150 | | 64 | 3 | 30 | 3 | | Catamenia August 3 to 6 |
| 8-6-39 | 2375 | | 59 | 12 | 23 | 6 | | |
| 8-7-39 | 2000 | 1 | 73 | 7 | 18 | 1 | | Hospitalized, 1 cc Reticulogen |
| 8-8-39 | 1800 | | 81 | 12 | 4 | 3 | | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-9-39 | 2000 | 7 | 65 | 25 | 2 | 1 | | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-10-39 | 3700 | 15 | 51 | 28 | 3 | 1 | 2 | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-11-39 | 3800 | 39 | 40 | 17 | 3 | 1 | | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-12-39 | 4400 | 61 | 23 | 5 | 6 | 1 | | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-13-39 | 6225 | 54 | 33 | 5 | 4 | 2 | 4 | 1 cc Reticulogen 5 cc Pentnucleotide |
| 8-15-39 | 8150 | 70 | 21 | 2 | 6 | | 2 | Discharged from hospital 1 cc Reticulogen |
| 8-16-39 | 9000 | 73 | 20 | 1 | 6 | | 1 | |
| 8-18-39 | 8150 | 77 | 18 | 1 | 4 | | | |
| 8-24-39 | 5700 | 66 | 24 | 4 | 4 | 2 | | |
| 9-5-39 | 9750 | 76 | 13 | 4 | 6 | 1 | | |

The right tonsillar region became sore, and two spots of exudate appeared there. There was anorexia, and severe headache.

On August 7 the patient received 1 cc. of Reticulogen intramuscularly. On August 8 the patient vomited, the cold chills continued and she was again hospitalized. She

down the inside of each arm and in the fourth and fifth fingers of each hand. The patient felt as though she were dying, the sensation beginning at the fingers and working upward. There was no substernal pain or constriction. One cubic centimeter of adrenalin gave prompt relief. Following this, two injections of 5 cc. of Pentnucleotide with

0.5 cc. of epinephrine and 1 cc. of Reticulogen were given daily. The Pentuonolone produced mild transitory numbness of the fourth and fifth fingers. The white-cell counts steadily rose under this regime. The percentage of eosinophils rose to 30, suggesting an allergic reaction. During all stages of the illness, but especially during recovery the patient showed many band forms and myelocytes, except during the extreme neutropenia. She always had a large number of platelets, many of them being very large. The red cells were essentially normal.

The patient made an uneventful recovery and was discharged August 13. It had been hoped that the effect of Pentobarbital-Sodium could be determined by the test-dose method also, since it had a "hangover" much like that caused by Allonal and sodium alurate, but it was deemed best not to risk the repeated production of granulocytopenia, and it was decided to avoid barbiturates in this case in the future.

This case is reported as one of granulocytopenia due to a barbiturate, alurate (allylisopropylbarbituric acid). Proved cases of agranulocytosis due to the barbiturates, especially those not containing a benzene ring, are quite rare. In 1933 Watkins⁸ reported without details 32 cases of agranulocytosis, of which 12 seemed due to barbiturates. One patient who had taken amidopyrine several times with resultant agranulocytosis developed granulocytopenia on another occasion after four daily 1½-gr doses of Pentobarbital-Sodium (sodium ethyl [1-methyl-butyl] barbiturate). Four other patients who took this drug died of agranulocytosis in their first attack. Five patients who took Amytal (isomylethylbarbituric acid) or its sodium salt preceding their neutropenia died, 4 in the first attack and 1 in the third. One patient died of agranulocytosis after taking phenobarbital (phenyl ethylbarbituric acid), but severe sepsis was also present. A patient who developed a toxic rash and leukopenia after taking phenobarbital recovered. Watkins did not believe that his cases proved that amidopyrine or the barbiturates were the etiologic factor in the agranulocytosis, but suggested that the patients might have had an idiosyncrasy, manifested by agranulocytosis. Hardwick and Randall⁹ found no agranulocytosis in 59 obstetric cases under pentobarbital-sodium analgesia, and Teel and Reid¹⁰ found none in 3592 cases in which this drug was used. The Council of Pharmacy and Chemistry of the American Medical Association¹¹ in 1934 stated "No definite case [of granulocytopenia] has been reported in which a barbiturate alone is responsible. From the present data it appears that barbiturates have little or nothing to do with granulocytopenia. Kracke¹² in 1934 agreed with Hardwick and Randall with regard to pentobarbital, and declared that he had made similar observations relative to all types of the so-called barbiturates. He emphasized that in no cases had the barbiturates alone ever been suspected of an

etiologic role in this disease, except possibly by Watkins. Kracke believed that drugs with a benzene ring, particularly those with an attached amine group, most often caused granulocytopenia. Bolton¹³ in 1935 concluded that the barbiturates, having two $-NH$ radicals, should be theoretically more toxic than amidopyrine, but stated that on the contrary the prevalence of barbiturate medication as a hypothetical factor in the etiology of the disease is relatively slight in comparison with that of amidopyrine. Madison and Squier¹⁴ and Benjamin and Biederman¹⁵ were unable to cause granulocytopenia with barbiturates in patients after recuperation from agranulocytosis due to amidopyrine. Meyer¹⁶ in 1936, reporting a series of 14 cases of agranulocytosis, mentioned that in 3 the only drugs taken beforehand were barbiturates (barbital, Sodium Amytal and "drugs of the barbiturate group"), but no causal relation was implied. Jacobson¹⁷ in 1938 reported a case of neutropenia following five years use of phenobarbital, but there was marked anemia also, so that this was not a pure case of agranulocytosis. Some cases listed in the *Quarterly Cumulative Index Medicus* as agranulocytosis following the giving of Amytal are found to be cases following the administration of Amytal Compound, a preparation containing amidopyrine. From the literature available, therefore, it appears that proved cases of granulocytopenia due to the barbiturates, especially those with no benzene ring, are distinctly infrequent.

About 300 cases of granulocytopenia following the administration of amidopyrine and proprietary drugs containing it have been reported. In the latter group Allonal formerly belonged, but, as previously mentioned since January, 1939, the formula has been changed from a combination of amidopyrine and alurate to one of acetphenetidin and alurate. No cases due to the "new Allonal, which this patient received, have been reported. Acetphenetidin has been suspected on three occasions as the causative factor in agranulocytosis. Kracke¹¹ in 1931 reported a case of fulminant agranulocytosis in a person who had taken large doses of acetphenetidin. This patient had marked methemoglobinemia over a long period and had been treated with many vaccines, three times for typhoid immunization, at first the case had been reported as one of agranulocytosis following typhoid vaccination. Costen¹⁸ in 1933 cited a case of agranulocytosis in which the patient had taken large doses of aspirin, phenacetin and bromides. Kracke and Parker¹⁹ in 1934 reported another case following acetphenetidin. With these exceptions acetphenetidin has not been blamed for the causation of granulocytopenia. The patient herewith reported had been given three daily doses of 5 gr. of acet

phenetidin (only 3 gr of acetphenetidin are contained in each Allonal tablet) with no effect on the blood, whereas two 1-gr doses of sodium alurate caused granulocytopenia. Hence, the alurate fraction rather than the acetphenetidin in the "new" Allonal appears to have been the etiologic agent causing granulocytopenia.

According to Jackson and Merrill¹⁴ and Thompson,¹⁵ 80 per cent of the patients with agranulocytosis are women, and a remarkably large number of attacks of granulocytopenia occur at or about the time of the catamenia. In Thompson's cases when recurrences took place, each coincided with the onset of the menses. Two of his patients who had previously had agranulocytosis showed distinct but transient asymptomatic neutropenia just before the onset of menstruation. This patient had a menstrual period from June 15 to 18 during the leukocytosis following tooth extraction, another from July 8 to 11 without any variation in the leukocyte or neutrophil count, and still another from August 3 to 6 during the last bout of neutropenia after sodium alurate. The catamenia had occurred just before the first admission for neutropenia on May 22, but Allonal medication had been taken before this neutropenia. From July 8 to 11 there had been no medication and the catamenia had no effect on the blood counts, giving a control period under observation. Incidentally it may be mentioned that the blood counts were almost all taken at the same time of the day, in order to eliminate error due to the normal diurnal variation in the white-cell count.

Patch tests were negative, but this has been reported in similar cases. Dameshek and Colmes¹⁶ reported 4 cases in all of which scratch, intradermal and patch tests were negative with amidopyrine, the offending drug. Fitzhugh¹⁷ states that the ordinary cutaneous tests for sensitivity to drugs are of little value in the case of hematologic sensitivity, whether negative or positive. He advocates the test-dose method, such as was used on this patient.

With respect to the relation of tooth extraction or sinusitis to agranulocytosis, it may be mentioned that Hill¹⁸ in 1926 reported 2 cases of agranulocytosis, 1 fatal, following extraction of teeth, without post-extraction medication, and Walsh¹⁹ in 1939 reported a case of agranulocytosis associated with maxillary sinusitis. The reported patient, however, had had medication after her tooth extraction in 1936, leukocytosis followed tooth extraction in June, 1939, the last bout of granulocytopenia had no relation to tooth extraction, and the sinusitis was neither acute nor marked, so that tooth extraction and sinusitis probably were not of etiologic significance in the granulocytopenia.

An interesting point for consideration is the similarity of structure of alurate (allylisopropylbarbituric acid or allylisopropylmalonyl urea) and Sedormid (allylisopropylacetyl carbamide or allylisopropylacetyl urea) and of their hematologic effects. McGovern and Wright²⁰ in 1939 stated that 45 cases of thrombocytopenic purpura hemorrhagica had been due to Sedormid. Kracke²¹ in 1938 noted that Sedormid had not been reported as a cause of agranulocytosis. Moody²² reported a case of purpura following Sedormid in which the neutrophil count dropped to 42 per cent with a white cell count of 7500, McGovern and Wright one in which the leukocyte count fell to 3350 with 36 per cent neutrophils, and Huber²³ one in which the leukocyte count dropped to 3350 (differential count not given). Apparently Sedormid, the structure of which is quite similar to that of alurate, can depress the leukocytes, particularly the granulocytes, as well as the platelets.

Fitzhugh¹⁷ in 1938 described abnormal leukocytosis after amidopyrine and other drugs. This seems to have happened after the first test dose of Allonal (7750 leukocytes with 93 per cent neutrophils) before leukopenia set in, as though marrow stimulation preceded depression. Fitzhugh also believes that the presence of young cells with granulocytopenia indicates "primary arrest of maturation" of the leukocytes, a "pernicious leucopenia" analogous to pernicious anemia, except that the leukocytes are arrested in their maturation process. The reported case showed immature neutrophils during most of the granulocytopenic period. Whether the liver extract or Pentnucleotide speeded up the maturation process is uncertain, for at least twice, in 1936 and in June, 1939, she recovered spontaneously, but it is true that convalescence followed rapidly after treatment was initiated.

SUMMARY

A case of granulocytopenia due to the "new" Allonal (alurate), with recovery following liver extract and Pentnucleotide therapy, is described and discussed.

The few reported cases believed due to barbiturates are mentioned.

The similarity of alurate and Sedormid in structure and in hematologic effect is noted.

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CLINICAL NOTE

DEVICE FOR ENSURING CONSTANT GASTRIC SUCTION*

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THE water suction siphonage method of Wangenstein§ is widely used for the decompression of the upper gastrointestinal tract. The device described here adapts the suction offered by a hospital vacuum system to the Wangenstein principle.

The source of suction may be a hospital vacuum system piped to the bedside or a motor suction machine which is to be found in many hospitals (Fig. 1). An airtight trap (A) should be interposed between the source of suction and the water column to prevent damage to the suction system. The jacket of the water column (B) is a 25-cm glass tube, 150 cm. long. Five millimeter glass tubes (C) are thrust through rubber stoppers at either end, these should extend to within 5 cm of the opposite end of the outside tube. Their inner ends are drawn out to the fineness of a medicine dropper to diminish the size of air bubbles. At the dependent end of the water column a short glass tube (D) is thrust through the rubber stopper, a rubber tube with clamp attached to this serves to drain off the water. A T-tube (E) is attached to the lower end of the apparatus and tubes from the

house vacuum and the patient are attached. A trap (F) to catch gastric fluids completes the circuit.

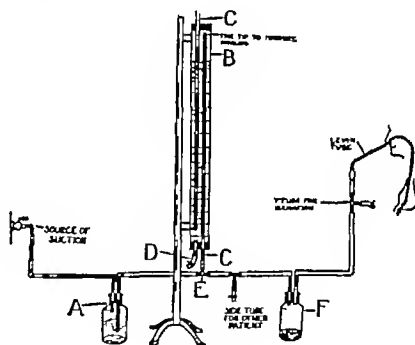


FIGURE 1

In the standard Wangenstein method a suction pressure equivalent to 75 cm of water is maintained, but the degree of suction may be varied at will by changing the height of the water column.

This method offers the advantages that the suction is continuous, nursing care is limited to emptying and measuring the contents of the trap and the amount of gastric fluid removed can be simply determined. It has been successfully used on approximately 30 ward cases over a period of three months.

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§Paine, J. R., and Wangenstein, O. H.: The necessity for constant suction to relieve nasal tubes for effective decompression or drainage of upper gastrointestinal tract. *Surg. Gynec. & Obst.* 57:601-611, 1933.

REPORT ON MEDICAL PROGRESS

THE DIAGNOSIS AND TREATMENT OF NUTRITIONAL DEFICIENCY*

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THE advent of purified and synthetic vitamins has created a considerable impression on both medical and lay opinion. The layman, perceiving the partial truth of the proverb that a man is what he eats, has been eager to accept the value of vitamins. The physician, provided with a new therapeutic weapon, and one furthermore that is apparently devoid of danger, has been equally glad to make use of this new achievement of biochemical science. The result has been that the literature is now replete with reports of the value of vitamin therapy in a remarkable variety of clinical conditions. Unfortunately many of these reports are based more on enthusiasm than on judgment. Although the administration of additional vitamins has been recommended in a number of conditions in which there is no definite evidence of nutritional disorder, it cannot be said that such recommendations are as yet supported by sufficiently reliable evidence to render them generally acceptable. Up to the present time vitamin therapy has been proved to be of value only in cases presenting positive clinical evidence of deficiency. If this limitation is not kept in mind, it seems likely that present enthusiasm will soon be replaced by disillusionment, resulting in the discrediting of the true value of nutritional therapy.

The purpose of this paper is to summarize the more valuable clinical criteria by which nutritional deficiency can be recognized, with the hope that it may help to define more clearly the various conditions in which adequate nutritional therapy can be expected to achieve results.

In considering a particular case suspected of nutritional deficiency, it is important at the outset to keep in mind certain general principles. It should be remembered that although nutritional disorders are often the result of economic restriction affecting the quantity and quality of the diet, there are nevertheless a great many individuals in whom such disorders occur in spite of satisfactory economic circumstances. The various predisposing conditions which may be responsible in

such cases have been fully discussed elsewhere¹⁻³; they may be summarized as follows:

A restricted or unbalanced diet, which may result from many causes, such as anorexia, food fads, alcoholism and special diets for gastrointestinal disorders, diabetes mellitus or weight reduction.

Defective absorption of food in organic or functional disorders of the gastrointestinal tract, including loss of teeth, achylia gastrica, gastritis, persistent vomiting, pylorospasm, pyloric stenosis, malignant disease, chronic enteritis or colitis, steatorrhea, parasites, biliary obstruction and surgical short circuits of the intestinal tract.

Increased dietary requirements due to rapid growth (especially in infancy), pregnancy, lactation, hard physical labor, prolonged fever, hyperthyroidism, or loss from the body of formed essentials requiring adequate nutrition for their replacement, as in hemorrhage and albuminuria.

Defective utilization occurring especially in diseases of the liver.^{4, 5}

Another principle to be considered is that the primary effect of dietary deficiency is a change in function rather than in structure. In the absence of adequate supplies of the various essential components of the diet, normal metabolism is impaired. Many of the manifestations of deficiency disease are due solely to disordered metabolism, for which the term "metapathy" is suggested.⁶ Structural changes do not usually occur until the deficiency is well advanced, and are then probably a secondary effect of pre-existing metapathic disorder. Moreover, some structural changes when once established are to a large extent irreversible, such as combined system disease and the bony deformities of rickets. It is therefore absolutely essential that the diagnosis be made before such structural changes have occurred, so that treatment may be instituted when likely to be most effective. This implies that the history and symptoms are of relatively more significance than are physical signs in the early diagnosis of nutritional disease.

It is also worth remembering that deficiency of a single dietary factor is very rarely encountered in clinical medicine. A diet deficient in one es-

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sential factor is almost inevitably lacking in others. Thus, although the presenting features of a particular case may suggest an outstanding deficiency of one individual factor, careful search will usually reveal evidence that others are lacking. It is now recognized, for instance, that the classic syndromes of pellagra and beriberi are the result of multiple deficiencies. The fact that they can be identified as definite syndromes is probably due to the uniformity of the diet in the communities where they are endemic. In other localities where deficient diets are less uniform, many of the manifestations of these syndromes occur, although usually presenting a more diverse and less characteristic clinical picture.

Since most deficiencies are multiple, adequate treatment requires the administration of a combination of dietary essentials. In some cases, therefore, it is of little more than academic interest to decide whether the lack of one particular factor is responsible for a given clinical manifestation. From a strictly practical standpoint, it does not greatly matter that the exact causation of some of these manifestations is still obscure, or that some have a multiple etiology. Whatever the underlying cause, the treatment remains the same.

In the succeeding paragraphs an outline is given of some of the outstanding features in the history, physical examination and laboratory data which may be of value in establishing a diagnosis of nutritional deficiency. It should be emphasized that the correct diagnosis of nutritional deficiency frequently cannot be made without a full clinical study, and that many of the manifestations of deficiency are not in themselves diagnostic, and are only significant when considered in relation to other relevant findings. In addition to the special features mentioned, attention should of course be paid to all other abnormalities, particularly those providing evidence of any of the predisposing conditions previously listed.

HISTORY

Age and Sex

The age and sex of the patient should be considered, particularly in relation to the incidence of some of the foregoing predisposing conditions. There is a distinct age incidence in some deficiency syndromes, for instance, rickets occurs in infancy, while pellagrous dermatitis is usually seen in adults. Nutritional anemias are commonest in women and children.

Diet

The dietary history is obviously extremely important and at the same time frequently very difficult to elicit. An attempt must be made to assess

the adequacy of the diet in terms of both quantity (calories) and quality (protein of good biologic value, mineral salts and vitamins). It is useful to know whether the diet has been essentially the same over a period of years, or whether it has undergone some recent alteration. In connection with the quality of the diet, it is particularly important to inquire about the intake of the so-called "protective foods,"—meat, dairy products, fruit and fresh vegetables,—on which the supply of essential food factors largely depends. If the diet is devoid of any of these foods it is a point of definite significance. But if the patient states that they are taken occasionally, "now and then" or "when I can afford it," a great deal of further questioning will not help materially to assess exactly how much of these foods are in fact consumed. The difficulty is that even the most intelligent gourmet finds it hard to remember what he ate two days previously. Furthermore, it is difficult to think of food in terms of quantity, the size of "an ordinary steak" is very much a matter of individual opinion. Most physicians would find it hard to give an account of their meals during the previous week with sufficient accuracy to enable a dietitian to determine correctly their caloric consumption, and whether this varied from day to day. The most valuable information about the diet is frequently derived from facts elicited under the next heading.

Economic History

The amount of money which the patient has available for the purchase of food, together with an estimate of his ability to make the best use of it, is often the most valuable single criterion by which the adequacy of the diet may be judged. No hard and fast rule can be laid down as to the minimum sum which will purchase an adequate diet. It obviously varies very greatly in different communities—whether rural or urban, with or without facilities for home production of food and so forth. The evaluation of the adequacy of a given income must depend on a knowledge of local conditions.

Family History

The family history is useful in providing further information about dietary habits, who prepares the food, and how many others in the household there are to be fed, also whether there is evidence of malnutrition in other members of the family. In the case of a married woman, recent or present pregnancy should be considered. Inquiry should also be made concerning the familial incidence of conditions predisposing to nutritional disorders, such as achylia gastrica and diabetes mellitus. In some cases, particularly when addiction to alcohol is suspected, valuable additional information not

volunteered by the patient may be obtained by questioning friends or relatives

Occupational and Social Histories

The occupational and social histories may give information concerning the regularity of meals and facilities for obtaining them. The nature of the occupation, whether sedentary or active, may help to decide the dietary needs

Habits

The use of alcohol is an important consideration in determining the nutritional status.⁷ Alcohol not only affects the appetite, but because it provides calories without accessory food factors its metabolism tends to exhaust the body's reserves of such substances. Furthermore, chronic alcoholic addicts are notoriously careless about eating

General Health

Inquiry should be made as to the patient's sense of well-being and ability to work, whether there is a feeling of lassitude, fatigue or exhaustion. Change in weight is a vital point. Recent illnesses or operations should be considered. Nutritional disorders frequently follow infectious illnesses, perhaps because of the increased nutritional requirements during fever, combined with a diminished intake of food and impaired digestion. This fact has been responsible for repeated assertions in the past that several diseases now known to be due primarily to dietary deficiency were infectious in origin

Systemic Review

Inquiry should be made whether the patient has been conscious of suffering in the past or present from any of the objective manifestations mentioned below under "Physical Examination." In addition, the following subjective symptoms should be considered

Muscles and skeleton Muscular pain, particularly when induced by exercise, is probably an important symptom of thiamin deficiency.⁸ Obscure pains in the extremities may occur in scurvy as a result of periosteal or other deep-seated hemorrhages

Eyes Hemeralopia (night blindness) and nyctalopia (glare blindness) are frequently indicative of vitamin A deficiency.⁷ When corneal or conjunctival lesions due to vitamin A deficiency are present, the patient may complain of a burning, gritty sensation in the eyes

Cardiovascular system Palpitation, dyspnea and swollen legs are usually complained of in heart disease due to beriberi.⁸

Gastrointestinal system Anorexia is an important symptom, since it may in itself be a cause of inanition. In some cases it may perhaps be the

result of thiamin deficiency. A sore tongue is a characteristic symptom of sprue, pellagra and pernicious anemia. Dysphagia occurs in the Plummer-Vinson syndrome associated with iron-deficiency anemia. A burning sensation in the epigastrium may be complained of in pellagra⁹, a common symptom of this disease is diarrhea, which may also be troublesome in nutritional anemias associated with achlorhydria. In mild vitamin B complex deficiency, however, constipation is frequently encountered.⁹ Other gastrointestinal symptoms are significant as evidence of digestive disturbances that may give rise to "conditioned" deficiency.¹⁰

Nervous system Abnormal mental states have meaning both as evidence of influences affecting the intake of food and as symptoms of the mental disturbances of deficiency mentioned below. In nutritional polyneuritis the symptoms of persistent numbness, paresthesia, difficulty in walking and pain in the lower extremities, particularly in the soles of the feet, are of great value in establishing an early diagnosis.¹¹

PHYSICAL EXAMINATION

General Appearance

The general physical condition serves to give an impression of the severity of the disorder

Skin

Much may be learned from an examination of the skin. The following abnormalities should be looked for. An unusually loose or thin skin is often an index of recent weight loss due to alteration in nutritional status. Edema, dependent or widespread, may occur as "hunger edema" due to protein deficiency with hypoproteinemia, and also in beriberi, which may coexist. Dermatitis due to vitamin A deficiency is characterized by hyperkeratotic plugs obstructing the orifices of the sweat glands, and consequent hypohidrosis and dryness of the skin.¹² These changes are usually most prominent on the thighs and upper arms, and give the appearance of persistent goose flesh. Deficiency of nicotinic acid is apparently responsible for the greater part of typical pellagrous dermatitis, which is characterized by hyperkeratosis, pigmentation, desquamation and fissuring, with underlying erythema. The lesions frequently have a "glove, sock and necklace" distribution, and may also be present over the bridge of the nose. It should be remembered that the classic picture of pellagrous dermatitis is rare except in subjects exposed to the sun. Pellagrins who spend much of their time indoors or who live in a sunless climate may show other less typical skin changes.¹³ The dermatitis may be limited to sites subject to mechanical irritation, perianal, labial or scrotal dermatitis is an

example, or intertrigo beneath the breasts. In bedridden pellagrins erythema may appear over the pressure areas—the elbows, knees and hips. In addition there are certain other skin changes which have been recognized⁹ as part of the pellagrous syndrome. These include a fine, branny, scaling desquamation over the trunk and elsewhere, hyperkeratosis over the knees and elbows, a peeling desquamation of the feet (not limited to the areas of pressure) and a type of desquamation, particularly over the legs, giving the appearance of lacquer having been painted on and having cracked, leaving a mosaic pattern. A type of nutritional dermatitis has been described that has been cured by riboflavin. This consists of a scaly, greasy desquamation of the nose and sometimes of the ears and eyelids.¹⁴ Acne rosacea is a useful indication of achlorhydria and consequent increased liability to nutritional disorders, of which it is perhaps a consequence. In some advanced cases of nutritional disease the skin becomes thin, shiny and atrophic. The presence of petechiae or ecchymoses in the skin, associated with other evidence of nutritional disease, suggests deficiency in ascorbic acid (vitamin C) or vitamin K. The latter deficiency is particularly likely if jaundice is also present. In scurvy, minute hemorrhages are commonly present around the hair follicles, especially in dependent areas, and the follicles are sometimes hyperkeratotic, reminiscent of vitamin A deficiency.¹⁵

Hair

An overgrowth of hair over the trunk and sometimes the face occurs in anorexia nervosa¹⁶ and occasionally in undernourished children. It may be an effect of inanition on endocrine activity.

Nails

Spoon shaped, brittle or lined nails may occur in association with nutritional diseases.

Skeleton and Muscles

The bony deformities of rickets and osteomalacia are too familiar to require description. Tenderness of the leg muscles, particularly after exercise, is probably an important sign of thiamin deficiency.⁴ Tetany should be looked for in cases suspected of rickets. Muscular wasting occurs in many cases of malnutrition.

Eyes

Inspection of the palpebral conjunctivae may help in the diagnosis of nutritional anemia. True xerophthalmia is a very rare manifestation, indicative of severe vitamin A deficiency. A commoner sign of vitamin A deficiency is a frosted glass appearance over the scleral conjunctivae.⁴ Unusual

vascularization of the cornea (keratitis) has recently been described¹⁷ as a sign of riboflavin deficiency. Nystagmus and hippus may occur in cases of dietary deficiency associated with alcoholism, and are conceivably a prelude to the severer signs of cranial nerve paralysis occurring in Wernicke's superior hemorrhagic poli-encephalitis. Examination of the fundi may reveal petechiae (vitamin C and vitamin K deficiencies), and is useful to exclude organic diseases of the eye in cases of night blindness in which vitamin A deficiency is suspected.

Mouth

Lips Pallor of the lips is a useful indication of nutritional anemia. Maceration and fissuring at the corners of the mouth (angular stomatitis) and a change at the line of closure of the lips characterized by redness and denudation (cheilosis) have been recognized¹⁴ as manifestations of nutritional deficiency and have been cured by synthetic riboflavin.

Tongue The tongue may be red, painful and swollen in pellagra. In the acute phase of pernicious anemia it may be beefy, red and painful, with or without the smoothness due to loss of papillae that is seen in the chronic stages of this disease. In hypochromic anemia associated with achylia gastrica the tongue may be smooth, flabby, pale and atrophic. An aphthous stomatitis may be present in some cases of dietary deficiency, notably in pellagrins and undernourished children.

Teeth The absence of teeth may predispose to inadequate nutrition. In deficiency of calcium and the fat-soluble vitamins the teeth may show poor development and widespread caries. In scurvy they may be loose, and the gums swollen and bleeding. It is necessary to remember that in edentulous subjects scurvy produces no changes in the gums.

Respiratory System

Laryngeal involvement (laryngismus stridulus) may occur in rickets associated with tetany. Pneumonic infections are common in severe vitamin A deficiency in children.

Cardiovascular System

The most serious nutritional disturbance involving the cardiovascular system is the heart disease of beriberi. This is characterized by tachycardia, cardiac dilatation, edema and peripheral vasodilatation.⁸ The last is manifested clinically by an unusual warmth of the edematous extremities, and is probably responsible for the fact that the blood circulates with greater speed than in nearly all other types of heart disease associated with venous congestion, as can be shown by determining the circulation rate.

Abdomen

Ascites may be present in beriberi heart disease or in "hunger edema." A palpable liver edge or spleen may help in the diagnosis of alcoholism and of hepatic disorders predisposing to vitamin K deficiency. A close search should be made for evidence of gastrointestinal abnormalities possibly responsible for "conditioned" deficiency—abdominal tenderness, palpable masses, operative scars and so forth.

Nervous System

Mental status Undoubtedly the outstanding mental consequences of chronic malnutrition are apathy, spiritual resignation, lassitude and loss of ambition. This fact has probably had a strong influence on the course of human history. Popular social upheavals have usually occurred at times of plenty rather than of poverty. Ships' crews afflicted with scurvy have seldom mutinied. Babies that never give a moment's trouble are not infrequently chronically underfed. The mental calm that comes with starvation is understood in India, and this phenomenon has enabled quacks to earn a considerable livelihood by recommending a diet consisting solely of orange juice.

Other mental disturbances may occur in severe deficiency states. In pellagra there is sometimes a severe psychosis, which may progress to persistent amentia in chronic cases. In beriberi heart disease, restlessness and anxiety are common. Korsakoff's psychosis, characterized by delusions, disorientation and confabulation, is another mental condition that may be associated with gross malnutrition. Finally there are the acute manifestations of delirium tremens, and the stupor of alcoholic encephalopathy and Wernicke's disease, all of which may be associated with malnutrition in alcoholic subjects.

Cranial nerves Nystagmus sometimes occurs in alcoholism. Ocular paralyses are usual in Wernicke's disease.¹⁸ Retrobulbar neuritis may occur in association with severe deficiency disorders.¹⁹

Motor and sensory systems Nutritional polyneuritis occurs in a variety of deficiency syndromes. Though clearly the result of dietary deficiency, it is still by no means proved that it is usually due to lack of thiamin,⁶ as has been frequently claimed recently. Motor changes of polyneuritis may be manifested by loss of ankle jerks, followed by loss of knee jerks and even of the tendon reflexes in the upper extremities. The sensory manifestations of polyneuritis are usually most marked in the lower extremities, and may include any of the following: hyperesthesia, — particularly in the soles of the feet

when the plantar response is elicited, — skin hypesthesia and loss of the vibration and position senses. In pernicious anemia, and also certain conditions associated with severe deficiency of the vitamin B complex, changes in the spinal cord occur that may be manifested by a Babinski sign, altered tendon reflexes and sensory disturbances.

LABORATORY DATA

The following investigative procedures may be of value in individual cases. The tourniquet test is useful in the early diagnosis of scurvy.²¹ X-ray examination of the growing points of the bones may confirm the early diagnosis of rickets and scurvy, and may reveal periosteal hemorrhage as the cause of obscure pain in scorbutic infants and children. X-ray studies are clearly indicated when the deficiency is suspected of being the result of some organic disturbance of the gastrointestinal tract. Complete blood examination is essential when nutritional anemia is suspected. The diagnosis of "hunger edema" must largely depend on the estimation of serum proteins and the exclusion of other causes of edema. The stools should be examined for fat in suspected cases of steatorrhea. Blood or parasites in the stool may afford an explanation in cases of nutritional deficiency associated with an apparently adequate diet. Acholic stools may confirm the diagnosis of obstructive jaundice and consequent predisposition to vitamin K deficiency. The determination of acid in the gastric juice, particularly after the injection of histamine, is a useful indication of predisposition to nutritional disturbances. The diagnosis of vitamin K deficiency is confirmed by the determination of the prothrombin clotting time of the plasma.²⁰ The estimation of ascorbic acid in the blood is some index of the recent adequacy of the diet in respect to this vitamin, but a diminished level of this vitamin in the blood is not diagnostic of clinical scurvy. Methods for estimating other vitamins in the blood and urine and the instrumental measurement of dark adaptation in vitamin A deficiency are at present not sufficiently standardized to be useful for routine diagnostic purposes.

TREATMENT

Once the diagnosis is established the basic treatment is always the same, that is, to alter or increase the diet so that adequate amounts of the factors that are lacking will be provided. In cases where nutritional deficiency has arisen primarily from economic want, it may sometimes be beyond the power of the physician to provide an adequate remedy. But in such cases it is often possible to give definite assistance by suggesting ways in which the family budget can be directed more

economically toward the purchase of an adequate diet. In this connection the help of a social service organization is invaluable. It should be kept in mind that in many cases more benefit is likely to accrue from money spent in the purchase of nutritious food than from that paid to a druggist for expensive vitamin preparations. This is particularly true if the diet has been deficient in protein of good biologic value, on which the supply of essential amino acids depends. But whatever the financial situation, a primary consideration is whether the food is palatable, the art of a good cook is often the best preventive against nutritional disorders.

When there is definite evidence of a moderate deficiency of some particular factor or factors, recovery may be expedited by supplementing the readjusted diet with preparations that provide an additional source of the factors which are lacking. For this purpose it is in most cases best to use crude preparations, cod-liver oil to supply vitamins A and D, yeast concentrate or liver extract as a source of the entire vitamin B complex, fruit juices for vitamin C. Such preparations are not only cheaper but sometimes more effective than purified or synthetic vitamin preparations, since they may contain valuable factors not yet available in purified form. Iron salts and vitamin K, when indicated, are most effectively administered in pure form. Other concentrated preparations—Percomorph and halibut liver oil, synthetic thiamin, nicotinic acid, riboflavin and ascorbic acid—should usually be reserved for the rare cases that present outstanding signs indicative of severe deficiency of some particular factor or factors, for example clinical pellagra, beriberi, scurvy and rickets.

In cases where the deficiency has arisen as a secondary effect of some gastrointestinal disorder parenteral administration of accessory food factors may be indicated. For this purpose synthetic vitamins are valuable, but again, in many cases a crude preparation is to be preferred, and for this purpose unrefined liver extract is most valuable as an injectable source of the vitamin B complex.

The appropriate dosages of the various preparations available have already been discussed in previous articles²²⁻²⁴ appearing in this series, and will not be repeated here.

CONCLUSION

The correct diagnosis of nutritional deficiency usually depends on the clinical appraisal of information obtained from the history, physical examination and laboratory tests. In the absence of a definite diagnosis of deficiency, it is unwise to expect that the administration of concentrated preparations of vitamins will result in any benefit, except possibly some psychological improvement through suggestion. Much nutritional disease may be prevented by the constant watchfulness of the physician, who, by giving advice on the quality and quantity of food to purchase, and even on ways to make it more palatable, may avoid the difficulties of treating cases in which the disorders of malnutrition have advanced to the stage of anatomic and sometimes irreversible changes.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26181

PRESENTATION OF CASE

First Admission A forty-seven-year-old housewife was admitted to the hospital complaining of infrequent attacks of coma of five years' duration.

The patient was well until five years before admission when she experienced her first attack of increasing weakness and profuse sweating, this was followed by a slowly progressing period of unconsciousness from which she was aroused by an "injection of glucose and caffeine" administered by her physician. She had had seven similar attacks during the five-year period before her hospital entry, and was relieved from each by the injection of intravenous glucose or by a diet high in carbohydrate content. The last attack, her eighth, which occurred some two weeks before admission, was not treated, and she recovered from "coma" after a three-hour interval. It was noted that these episodes were precipitated whenever a meal was missed.

During the same five-year period she also experienced nausea, relieved by vomiting, occurring in spells lasting as long as twelve hours. The vomitus was sometimes watery, and at other times was "bitter, like gall." There was no apparent relation to food or bowel habits, both of which were normal, although her appetite was generally poor. She had lost no weight.

About four years before admission she was ill with "pneumonia," from which she recovered slowly, leaving her with a persistent wintertime productive cough. No hemoptysis or night sweats were noted, although she did on occasions experience slight dyspnea on exertion, palpitation and bilateral chest pain with deep breathing, located mostly in the upper back.

At the onset of the illness five years before entry her physician had made a diagnosis of myxedema—the basal metabolic rate was -42 per cent—and had prescribed thyroid tablets. She took the drug daily (Armour's, 2 gr. in the winter and 1 gr. in the summer), and improved, the basal metabolic rate rising to -6 per cent. She was studied in an outside hospital five months before entry, and she was discharged after a few weeks to her private physician, who again placed her

on thyroid therapy following the last attack of coma two weeks before entry.

The patient lived with her husband and their two children. There had been no miscarriages. Following the birth of her last child seventeen years before admission the previously normal catamenia became "irregular" and infrequent, she flowed about once every six months. The last period had occurred four years before entry, and she apparently had not experienced the "hot flashes" or other stigmas of the menopause.

The remaining family, marital and past histories were non-contributory.

Physical examination revealed a well-developed but somewhat thin, ambulatory woman, in no obvious distress and weighing 93 pounds. The skin was dry and pale, and had a lemon yellow sheen. There was a loss of axillary and pubic hair. The mucous membranes were pale, the mouth was edentulous, and the tongue was smooth and beefy. There was a corneal opacity of the left eye. The chest expansion and lung resonance were normal and equal, but increased tactile fremitus and spoken and whispered voice sounds and amphoric breathing were present in the upper half of the right thorax. No rales, however, were audible. Examination of the heart was negative. The blood pressure was 94 systolic, 64 diastolic. The abdomen was soft and unremarkable. The mucous membranes of the vagina were atrophic. The remainder of the physical examination was negative. There were no areas of pigmentation of the skin.

The temperature, pulse and respirations were normal.

Examination of the blood revealed a red-cell count of 3,120,000, with 74 per cent hemoglobin, a white-cell count of 7600, with a normal differential count, reticulocytes 1 per cent, cell volume 30.8 per cent, volume index 1.18, color index 1.14. The basal metabolic rate was -34 per cent. The serum sodium was 123.4 meq. per liter, the potassium, 8.4 meq., the chlorides, 94.7 meq., the total base, 138.9 meq., the protein, 5.15 gm. per 100 cc., the calcium, 3.3 meq., the phosphorus, 3.3 meq. The plasma volume was 2225 cc., and the interstitial fluid volume was 11,180 cc. The blood Hinton test was positive, but the Wassermann test negative. A sugar tolerance test using venous blood (macrotechnic) was as follows: fast ing, 72 mg. per 100 cc., 30 minutes, 91 mg., 1 hour, 94 mg., 2 hours, 59 mg., 3 hours, 97 mg., 4 hours, 87 mg., 5 hours, 91 mg. A sugar tolerance test using capillary blood (microtechnic) was as follows: fasting, 51 mg. per 100 cc., 1 hour, 89 mg., 2 hours, 61 mg., 3 hours, 101 mg., 4 hours, 93

mg., 5 hours, 100 mg. A gastric analysis showed no free acid after histamine. A quantitative prolan test was negative for 40 units per 100 cc. No follicle stimulating hormone was found in the urine.

Röntgenograms of the chest showed mottled dullness involving both upper lobes as low as the third rib on the left and the fourth interspace on the right. Mottling was rather soft and confluent from the second to the fourth rib on the left, whereas in the other areas it presented a fine honey-combed appearance. Both lung roots were markedly elevated, and the lower portions of the lungs were emphysematous. The heart was unusually small, and what appeared to be the apex was on the right side. The pulsations of the heart, however, were more vigorous on the left side. The aorta and esophagus were in the normal position. The spleen and the gas bubble of the stomach were in the left side of the abdomen. Numerous small gallstones were present within a moderately dilated gall bladder. Films of the skull, the genitourinary and gastrointestinal tracts and the skeleton were essentially normal. An electrocardiogram was negative except for low voltage.

The patient experienced several attacks of coma or semi-coma, which usually occurred in the early mornings or at times when meals were delayed. Food or sugar brought prompt recovery. During these episodes she seemed drowsy and did not respond, although her eyes were usually open, the extremities were "hyperactive," and rarely were moist with perspiration. Save for these attacks, the thirty-nine-day hospital stay was rather uneventful. She was studied thoroughly, however, and treatment consisted of the administration of two pituitary extract preparations (oot on the market), yeast, iron, liver extract, haliver oil and a high-salt diet. She was discharged to her private physician.

Second Admission (two and a half weeks later) She was readmitted for a checkup. During her stay she had a few unconscious episodes similarly relieved by dietary or parenteral administration of glucose. On one occasion the blood sugar before breakfast was 58 mg per 100 cc. The repeat chemical studies were practically unchanged. She became mildly psychotic at one time, but this was relieved by general improvement in nutrition. She ran an otherwise unremarkable course, and was discharged to her private physician on the forty-eighth hospital day.

She remained at home after discharge and seemed to gain weight and to improve generally on a regimen consisting of a high-calorie, high-vitamin diet, the frequent ingestion of salt pills,

small frequent feedings, rare liver extract, vitamin D and iron pills. At one time she was given small amounts of Wilso's cortical extract. She seemed to be fairly well the following fourteen months. About four months before death she began to gain weight, although she had stopped taking salt tablets. Her weakness increased, and following a period of unconsciousness she died seven years after the onset of symptoms.

DIFFERENTIAL DIAGNOSIS

DR ALFRED KRANES Before attempting to answer any of the questions presented by this case I should like to ask a few myself. Can anyone enlighten me on these figures for plasma volume and interstitial fluid volume? Are they high or low?

DR JOHN TALBOTT The plasma volume is slightly elevated. I should think the interstitial fluid volume was essentially normal for the body weight.

DR KRANES The calcium and phosphorus values are somewhat confusing. I am used to seeing them expressed in milligrams per 100 cc.

DR TALBOTT In preparing this abstract I neglected to express these concentrations in the usual way. The serum calcium is 6.6 mg per 100 cc, the phosphorus 8 mg.

DR KRANES Although no urine is recorded I take it a number of examinations were done and were normal.

DR TALBOTT Yes.

DR KRANES May I see the chest plate?

DR OTTO SAHLER There is mottling over both upper lobes, and an extremely small heart, which, in this view, appears to be shifted to the right.

DR KRANES How about the apices? Is there anything to suggest tuberculosis?

DR SAHLER The most likely diagnosis is tuberculosis.

DR KRANES It probably does not have much bearing on the rest of the problem.

The symptoms for which this patient presents herself, namely the attacks of coma, appear to be due to spontaneous hypoglycemia although there is no conclusive proof of that since there is no record of a blood sugar having been taken during an attack. The history, however, seems fairly characteristic. These attacks came on when meals were skipped or delayed, and the prompt relief by parenteral injections of glucose or carbohydrate by mouth plus the extraordinary low blood sugar values and flat blood sugar curve, leaves little doubt that these must have been attacks of spontaneous hypoglycemia. The causes for attacks of this type are relatively few and leave us little in the way of differential diagnosis, it seems to me. The commonest cause is a local

ized adenoma of the pancreas, or generalized hyperplasia of the islet tissue, neither of which can be excluded short of laparotomy. If we make such a diagnosis, however, it leaves too much of the picture unexplained. Inasmuch as a pancreatic adenoma does not explain the whole picture, I should prefer to look elsewhere for the cause of the hypoglycemic attacks.

Another cause of hypoglycemia is extensive damage to the liver resulting in interference with glycogen storage. Cases of this type have been reported with extensive metastatic cancer of the liver or with destruction of the liver due to other causes. In this patient there seems to be no clinical evidence of disease of the liver. To be sure, there was the x-ray finding of gallstones, but they never seem to have caused obstruction of the biliary ducts, and although no liver function tests were done, it seems rather unlikely that a damaged liver was the cause of the hypoglycemic attacks.

So far as I can see, there remains only one other cause, namely anterior pituitary insufficiency. Pituitarectomized animals will frequently exhibit hypoglycemia, and in human beings in whom the pituitary gland has been replaced by tumor tissue, or destroyed by some other process, spontaneous attacks of hypoglycemic coma may also occur. They are extraordinarily sensitive to insulin as well, and this is presumably due to absence of the blood-sugar-raising factor, the diabetogenic hormone, or perhaps the insulin-neutralizing hormone. Just what the mechanism is has not entirely been elucidated.

The more one examines this case the more one's attention is directed at the pituitary gland, and the hypoglycemia is best explained on that basis. This does not seem to be the usual clinical picture of myxedema, despite the very low basal metabolic rate. Myxedema usually responds very well to thyroid substitution therapy, whereas this patient apparently did not improve as one might expect. Despite thyroid administration, the basal metabolic rate on entry was -38 per cent. It would seem, therefore, that we are not dealing with the simple atrophic thyroid gland of myxedema, but rather with a lack of thyrotropic hormone.

Looking further, the menstrual history is a little curious. I should guess from the story that the disease may well have started following the birth of her last child, since symptoms of hypogonadism, namely menstrual periods every six months, began shortly thereafter and at the age of forty-three the periods ceased. That may have been a normal menopause, but she had none of the usual menopausal symptoms. The absence of

hot flashes is rather characteristic of the pituitary type of amenorrhea. Although I realize some patients with a normal menopause may not have hot flashes, nevertheless the majority do. That this was not a normal menopause is further suggested by the absence of follicle-stimulating hormone in the urine. Normal menopausal urines usually contain increased amounts. We, therefore, have evidence of a lack of gonadotropic as well as thyrotropic and diabetogenic hormones.

The blood electrolyte studies are very interesting. They indicate that there may also have been a lack of adrenotropic hormone: there was a low total base with a low sodium and an elevated potassium, the characteristic findings of Addison's disease. Yet one cannot explain the entire picture on the basis of Addison's disease alone.

We have evidence of lack of diabetogenic, thyrotropic, gonadotropic and adrenotropic hormones, and try as I will I cannot make any other diagnosis except complete panhypopituitarism or Simmonds's disease. Most of these patients should be cachectic, but I do not know how cachectic this patient was. It states that she had lost no weight, and yet she weighed only 93 pounds. I wonder whether those who were taking care of her would say that 93 pounds was her normal weight?

DR FULLER ALBRIGHT: She was very thin.

DR KRANES: Had she always been thin? Had she lost any weight?

DR TALBOTT: She had been thin for many years, but I am certain she had lost weight following the onset of illness.

DR KRANES: Cachexia is not necessarily a feature of Simmonds's disease but usually is present. If this is a case of Simmonds's disease, the anterior portion of the pituitary gland should be completely destroyed or replaced by fibrous tissue. The disease frequently starts after childbirth, and from the evidence here, I should guess that it began following the birth of her last child. Her periods soon became very infrequent, but characteristic symptoms did not develop until many years later. Do we know anything about the last labor?

DR ALBRIGHT: No.

DR KRANES: The reason I ask is that frequently this disease occurs following a difficult labor or a labor during which a great deal of blood has been lost. Other causes for destruction of the pituitary gland are tumor, syphilis and tuberculosis. I think tumor is extremely unlikely, since we have no evidence of an expanding lesion in the skull. As for syphilis, the patient did have a positive Hinton test, which apparently was not checked by doing a lumbar puncture. I think it would have been of considerable interest to have

known what the spinal fluid showed. The other possibility is tuberculosis. My final diagnosis is Simmonds's disease, exact cause unknown, and probably a chronic fibrous pulmonary tuberculosis.

Dr. TALBOTT. There were many points of interest about this patient, but I shall comment on only two. She had changes in concentration of constituents of the blood which were characteristic of adrenal insufficiency. She was put on a high salt diet, and responded in a fashion—at least she lived one and a half years on this regimen. I am convinced that her general condition was improved during that time. She received in addition a large amount of carbohydrate, which diminished the attacks of hyperglycemia. The other interesting point was the myxedema. Apparently she had had a low metabolic rate for many years. When we saw her first she had none of the clinical signs of myxedema, but at autopsy she appeared so myxedematous that I failed to recognize her. Thus, she had a basal metabolic rate consistent with myxedema for years, but had clinical signs of the disease only as a terminal affair.

Dr. J. H. MEANS. I think it would be interesting to compare this case with the one Castleman and Hertz* reported. Their case had many of the features present here, but the attacks of hyperglycemia were lacking. We also have a patient on the wards whose case is similar to this but who does not have attacks of hyperglycemia.

Simmonds's disease probably presents a great variety of clinical pictures, and extreme cachexia is not a necessary part of the disease. Dr. K. W. Thompson, with whom I talked recently at New Haven, thinks the amount of food is important in determining the picture. One might have Simmonds's disease without cachexia but with the accent on hypoglycemia. The pattern will vary from case to case, and I think Dr. Kranes's logic is absolutely sound. From the premises given I do not see how one can draw any other conclusion. It would be unusual to see a patient with myxedema who by x-ray shows a small heart, for in this disease, the heart is nearly always enlarged.

CLINICAL DIAGNOSES

Simmonds's disease.
Cachexia
Myxedema.
Adrenal insufficiency
Hypoglycemia.

DR. KRANES'S DIAGNOSES

Pituitary insufficiency—Simmonds's disease.
Chronic fibrous tuberculosis.

*Castleman, B. and Hertz, S.: Pituitary fibrosis with myxedema. *Arch. Path.* 27:69-79, 1939.

ANATOMICAL DIAGNOSES

Cystic atrophy of anterior lobe of pituitary gland.
Simmonds's disease.
Pulmonary tuberculosis, healed, secondary
Atrophy of thyroid gland, adrenal glands and ovaries

PATHOLOGICAL DISCUSSION

Dr. TRACY B. MALLORY. The autopsy showed an extremely small pituitary gland, which consisted almost entirely of posterior lobe. Most of the anterior lobe was made up of a cyst about 4 mm in diameter, and only a few hundred cells were left, there was no extensive fibrosis. We did not run across any thrombosed vessels or any thing to enable us to make a diagnosis of infarction. The other endocrine glands were in general atrophic, the ovaries completely so, but she had passed the menopausal age and that did not mean much. The adrenal glands showed essentially normal medullas with extreme atrophy of the cortices, both weighed only 5 gm. The thyroid gland was also very small, weighing about 5 gm., and showed a marked grade of atrophy with a good deal of lymphocytic infiltration but no scarring, I am quite sure that this was primary atrophy and not the result of a local thyroiditis. The pancreas grossly seemed somewhat small. Microscopic sections—unfortunately we do not know from what spot the specimen was taken—showed a large number of islets. One can never reliably estimate whether the islets are increased or decreased without almost innumerable sections of the entire organ. The parathyroid glands appeared normal. The lungs showed rather extensive fibrosis of the apices, with no caseation or calcification we called it healed tuberculosis, but have no direct proof. The bronchi in that region were dilated. The heart was small, as was predicted, and the other viscera, such as the liver, spleen and kidneys, were correspondingly atrophic.

Dr. PAUL D. WHITE. Was the heart pulled over?

Dr. MALLORY. No, at least not markedly so.

CASE 26182

PRESENTATION OF CASE

A fifty-three year-old single American female hospital worker entered complaining of shortness of breath.

Approximately one month before admission at the onset of her summer vacation following a year's hard work at the hospital, she had had an attack of diarrhea which lasted four or five days. She attributed this to the water supply during the first week of her vacation. Two weeks before admission, after being exposed to bad weather, she developed a cold and a feeling of nausea. The

latter soon disappeared, but the cold persisted. Five days before entry she had another spell of nausea and decided to have her intestinal tract studied when she returned to work at the hospital. That evening, however, she had a sharp chest pain posteriorly. A physician made a diagnosis of pleurisy. She then developed a cough associated with small amounts of foul yellow sputum, and complained of dyspnea and orthopnea. There were no chills. She continued to have severe pain in the right lower chest and was brought into the Emergency Ward in an ambulance.

The family and past histories were noncontributory.

Physical examination showed a well-developed, somewhat obese woman sitting up in bed, slightly cyanotic, and in obvious respiratory difficulty. There was herpes of the lips. The tongue was red and coated. Examination of the chest showed diminished expansion on the right. Anteriorly and posteriorly over the right chest from the mid-scapula down there were increased tactile fremitus and bronchial breathing, rhonchi, moist rales and a friction rub. There were moist rales and rhonchi transmitted to the left chest. The heart sounds were of fair quality. The blood pressure was 140 systolic, 75 diastolic. The abdomen was distended.

The temperature was 102°F (rectal), the pulse 156, and the respirations 28.

Examination of the urine was negative. The blood showed a red-cell count of 5,080,000 with a hemoglobin of 75 per cent, and a white-cell count of 14,850 with 46 per cent mature polymorphonuclears and 46 per cent young forms. The stools were negative. Sputum examination showed Type 1 pneumococcus.

X-ray examination of the chest showed mottled dullness involving the lower half of the right lung field. The dullness obscured the outline of the diaphragm and right border of the heart. There was also a band of dullness extending up the axillary border to the level of the second rib. The left lung field was clear. The heart shadow was not displaced.

The temperature remained between 101 and 103°F for the first four days, and on the fifth day dropped fairly suddenly below 101. A skin test for horse serum was positive, and no anti-serum was given. She became weaker, more toxic and cyanotic, and was put into an oxygen tent. The sudden fall in temperature increased to the time she was placed in the tent. The signs in the lungs increased, the process extending to the right axilla. Scattered rales, some asthmatic and musical, and rhonchi, especially during expiration, were present on the left. The white-blood-cell count rose to 33,000.

formed on the left and thin pus obtained. A stained smear showed pneumococcus. The following day she was transferred to the surgical service and a trocar thoracotomy was performed under local anesthesia. About 100 cc of thin seropurulent fluid was obtained, the culture showed Type 1 pneumococcus. During the next two days she had two chills, each at 2 p.m.

The x-ray film taken on the sixteenth day showed that the process in the right lung was still present and that the area involved was about the same. The outline of the diaphragm, however, was distinctly seen on this side. The appearance was more that of thickened pleura and incompletely expanded lung. The temperature at that time was picket-fence in character, ranging from 99.5 to 105.0°F.

She continued to have chills, became unresponsive and developed edema of the lower extremities. There was a to-and-fro murmur over the heart. No petechiae were seen. She was unable to move the left arm. The knee-jerks were more active on the left. A chest tap in the left eighth interspace on the twentieth day was dry. Another done on the right in the anterior axillary line in the left sixth interspace yielded a few cubic centimeters of pus. An x-ray film taken the following day showed complete drainage of the pleural effusion on the right side. An apical systolic murmur was heard for the first time, but there were no physical signs of pericarditis.

She was transferred back to the medical service on the twenty-first day. The edema was more marked in the left foot than in the right. The left hand was puffy. There were twitchings of the right face. The right arm was spastic, and a Hoffmann sign was present on the right. The apical systolic murmur became loud and high pitched. The blood pressure on the left was 180 systolic, 60 diastolic, on the right 150 systolic, 30 diastolic. She rapidly failed, and died the following day.

DIFFERENTIAL DIAGNOSIS

DR RALPH ADAMS. A history of acute respiratory infection of two weeks' duration, productive of purulent sputum, is presented. Five days before entry, the pulmonary infection was complicated by pleural extension, as indicated by sharp chest pain, and by the development of dyspnea and orthopnea as pleural involvement developed.

The physical examination supported the suspicion of pleural infection by recording a friction rub and moist rales suggestive of pleural edema. Bronchial breathing, increased tactile fremitus, slight cyanosis, and respiratory difficulty also are reported. These findings must be accepted as indication of primary lung disease, characterized by consolidation and the production of purulent

ema, was causing the cyanosis and respiratory difficulty, because empyema, unless massive enough to displace the mediastinum and to collapse the lung, is not productive of obvious respiratory difficulty. The slight cyanosis sometimes associated with empyema is often called "white dyspnea," as distinguished from the "blue dyspnea" of oxygen lack. Proof that the empyema at the time of entry was in an early stage and not massive is furnished by the friction rub. A friction rub can be expected to disappear as sufficient fluid accumulates to separate the pleural surfaces.

The data of the clinical chart, with fever and rapid pulse and respirations, are additional supporting evidence of intrathoracic infection.

Laboratory examination of the sputum identified the clinically recognized pneumonia as due to Type 1 pneumococcus.

The hospital course described is one of pneumococcal pneumonia and pneumococcal septicemia, to which the patient offered no effective resistance. Drainage of the empyema did not materially alter the clinical course. The therapy described suggests that this patient was on the wards before the days of sulfapyridine, and before rabbit antiserum became available as a substitute for horse serum in indicated cases.

Neurological abnormalities appeared late in the course of the disease and as a terminal manifestation of septicemia. They were presumably due to septic cerebral infarcts.

A differential diagnosis in this case is rather hard to elaborate. Underlying cancer must be thought of in any patient with empyema beyond the fourth decade, but no feature of this case is suggestive of cancer of the lung, and the entire record is typical of acute overwhelming pulmonary infection.

CLINICAL DIAGNOSES

Empyema.

Lobar pneumonia, Type 1

Left hemiplegia

Pneumococcal septicemia

Bacterial endocarditis?

DR. ADAMS'S DIAGNOSES

Pneumonia, Type 1

Empyema.

Cerebral thrombophlebitis, with cerebral infarction

ANATOMICAL DIAGNOSES

Endocarditis, acute bacterial, mitral and pulmonary, *Staphylococcus aureus*

Meningitis, acute.

Pulmonary infarct, septic.

Brochopneumonia, resolving

Empyema, right.

Operative wound thoracotomy, right.

Diverticulosis of sigmoid

Cholesterosis of gall bladder

Fibroma of ovary

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY. Dr. Adams was of course correct in his surmise that this patient's course in the hospital took place some years ago. She certainly could not, at the present time, have escaped without a trial of chemotherapy. The underlying pneumonia with its secondary empyema was fairly obvious, and the major differential diagnosis lay in attempting to predict the further complications. The medical consultants considered both pericarditis and endocarditis in their effort to explain the murmurs which developed over the cardiac area, and believed that the weight of evidence was in favor of the endocarditis because of the cerebral symptoms. No one ever committed himself as to which valve might be involved.

The postmortem examination showed acute bacterial endocarditis of both the mitral and pulmonary valves, an unusual distribution in the absence of either aortic or tricuspid lesions. On each of the affected valves a large, shaggy, pedunculated mass was found which might easily have functioned as a ball valve. The one on the mitral valve was evidently the older of the two, since it showed considerable organization. That on the pulmonary valve, in contrast, seemed to be quite recent. The lung showed evidence of a resolving pneumonia of the right lower lobe, but also a localized white necrotic area, 1 cm in diameter, surrounded by a hemorrhagic border, which was evidently a septic infarct, almost certainly secondary to an embolus from the vegetation on the pulmonary valve. The empyema had been quite adequately drained by the trocar thoracotomy, and only about 30 cc. of thin, cloudy fluid was found. The other chief finding was in the central nervous system. There was a thick, greenish subarachnoid exudate over the right parietal, the upper part of the left parietal and the medial surfaces of both cerebral hemispheres. It was also found on the base of the brain around the optic chiasm and in the interpeduncular space. Careful throat examination showed no occlusion of any large cerebral artery, and in several sections no small vascular occlusion and no evidence of infarction could be made out. I think we must assume, therefore, that the cerebral symptoms were due to meningitis. Somewhat confusing findings of the autopsy were the postmortem cultures from the blood stream and from the meninges. Both of these showed a pure culture of *Staphylococcus aureus*.

time, and for several years afterward, when general practitioners were not so familiar with diseases of children as they are now, and there were not many well-trained pediatricians, he was in constant demand as a consultant. I remember one morning in 1921 when he was asked to go on six consultations—one in Western Massachusetts, one in Maine, one in New Hampshire, and three in or around Boston. He was a great comfort to the family and to the doctor; he had the power in high degree for sizing up the gist of the situation in a commonsense way and explaining it in such a manner that it could be understood. He made mistakes in diagnosis, as everyone does, if he did, it was never for lack of care. He was very gentle in handling children, and could be scathing to any nurse or house officer who was at all rough.

He was, above all, conservative, probably in his later years too much so. Conservative in accepting new methods in medicine until they had been thoroughly tried, the same in his politics, his investments, his opinions, in every detail of his life. But even after he had become relatively inactive in medicine he read assiduously, observed acutely and kept up with all that was new. Some of the modern ideas he accepted, others he rejected, sometimes he was right, sometimes wrong. He was not an obstructionist, he was not opposed to new theories as such, but he found it hard to accept them wholesale, particularly if various procedures might not be really necessary or might do harm to the child.

His attitude in this respect was, during his later years, somewhat exaggerated, but it did no harm. With his long experience he realized that fads come and go, and with his inborn caution he was chary of accepting anything new unless its worth had been fully demonstrated. Once he became convinced of the value of a new procedure, he became its friend, and was equally reluctant to let it go, if it had served him well. His office desk, until he retired, was the same one he had used in college, the calendar stand on his desk had been used by his grandfather, his chauffeur had started with him in 1906 when he bought his first automobile. Although he hated waste, and would save a piece of string rather than throw it away, his clothes came from one of the most expensive tailors, and his shoes were always made to order, of the finest materials, not because he liked expensive things as such, but because he thought they would last longer. If a thing or an idea worked, if it was good, he wanted to keep it, no matter how many new ones were available. His tastes were very simple, his whole outlook was frugal, it was abhorrent to him to spend money

foolishly, yet he was very generous, gave each year a large sum to the associated charities, and was scrupulously fair in all his financial dealings.

One of his chief characteristics was his consistency. If he had been in the habit of doing a thing or reacting to a situation in a certain way he would do the same thing again, and anyone who knew him well could predict with considerable accuracy how he would think or act. He was utterly reliable; if he said he would do a thing, he would do it. Most men are honest in the sense that they do not steal; not so many are intellectually honest—he was. He never permitted what he or anyone else thought ought to be so to sway his judgment if the facts were against it. As a rule, he did not make up his mind quickly, not because he did not know what he wanted, but because he wished to consider a matter in all its aspects before he formed an opinion on it. No one who did not know him well can realize how often his advice was sought, or how highly it was valued.

He was somewhat reserved in manner to those he did not know well, but underneath this reserve he was in reality a very friendly and sociable personality and enjoyed being and talking with other people. He had a keen sense of humor, and nothing pleased him more than a funny situation or story. He was by nature tactful, when tact was necessary, but was entirely independent and fearless in saying what he thought, no matter whether those whom it concerned liked it or not. Twenty-five years ago discussion in medical meetings was often more acrimonious than it is today, and inasmuch as when a paper did not please him he never hesitated to say so, often in a somewhat caustic manner, he sometimes made enemies. He was fond of saying nothing until everyone else had had their say, then he would sum up the situation, and if the discussion had been irrelevant, dull or foolish, he would let the gas out of the balloon with a few sharp comments.

If anyone had done him a kindness, he never forgot it, if an injury, he never forgot that, and could be vindictive toward anyone whom he thought had tried to harm him.

Medicine was of course his main interest, but he was by no means a man who did not know how to play. Before he was married, he did a good deal of big game shooting, particularly moose, and in the days of the poker coterie at the old University Club was a formidable player. He had an ideal family life. Mrs. Morse was his constant companion, he always talked over with her the many problems of administration and organization he had while he was actively engaged in hospital

work, and relied a great deal on her advice. He cared little for art, the theater, music or literature, but was devoted to nature, and at his small farm house in Wayland, where he went every week end, he took great delight in putting about at odd repair jobs and in observing and absorbing the things of outdoors—birds, of which he was very fond, trees and flowers. In the summer, he went for many years to Shelburne, New Hampshire, where he did about what he did at Wayland.

"Johnny" Morse was loved by all those who knew him well, particularly, as he grew older, by medical men younger than himself. A group of about thirty of these gave him a dinner on his seventieth birthday. At this dinner a poem was read which closed with the following lines

John Lovett Morse, by thee we set great store
Respect thee much, and love thee more.
A human true and kindly friend thou art,
A life well lived—thou st nobly done thy part.

L. W. H.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TRUSS, M.D., *Secretary*
330 Dartmouth Street
Boston

PYELITIS IN PREGNANCY

Mrs. B., a twenty nine year-old para II, was first seen in the office on January 27, 1923, when about nine weeks pregnant.

There was no history of familial diseases. The patient gave a history of scarlet fever, with no sequelae, at the age of six and of measles. There was no history of serious illness or operations. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted five days. The last period had begun on November 21, 1922, making the expected date of confinement August 28. The first pregnancy had been normal and had ended in a simple forceps delivery on August 17, 1918.

Physical examination showed a well-developed and nourished woman. The weight was 118 pounds, the patient having lost 5 pounds in two weeks. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The blood pressure was 126 systolic, 60 diastolic. The breasts showed slight engorgement. Vaginal examination revealed a cervix

that was soft and posterior, the fundus was anterior and enlarged. A specimen of urine was negative.

The pregnancy progressed normally with a normal blood pressure and a negative urine until May 19. At this time the patient weighed 131 pounds there was no edema and the blood pressure was 120 systolic, 60 diastolic. She complained of a severe pain in the region of the right kidney, but there was no fever. A specimen of urine procured a few days later showed a trace of albumin and 100 to 200 white cells per high-power field. At this time the temperature was ranging from 99°F in the morning to 103 or 104 in the afternoon. There was definite tenderness in the region of the right kidney, but no particular difficulty with micturition. From then until June 8 the temperature fluctuated between 98 and 103°F., with occasional chills. Treatment had been entirely symptomatic. Fluids were forced, and an ice bag was placed over the kidney. Urotropin was then given in 7½-gr doses four times a day for three days, and then sodium bicarbonate was prescribed to alkalinize the system. She was seen in consultation by a urologist, whose advice was entirely conservative—no thought of renal lavage entered the minds of the medical profession at that time. The consultant said that the condition might keep up, and on until the arrival of the baby, after which he believed that the pyelitis would clear up spontaneously.

By June 16 the temperature was approaching normal. The patient had lost a great deal of weight, had no appetite and felt very poorly. There was still some tenderness in the region of the right kidney. The urine showed a trace of albumin and 50 to 100 white cells per high-power field. Nature was extremely kind in this case, because from July 1 until September 4, when labor started, the urine was comparatively free from pus, and the patient had no fever and gradually recovered her appetite and general sense of well-being. She was delivered on September 4, and had a perfectly normal convalescence.

After that the patient never had other attacks of pyelitis. A specimen of urine taken on August 6, 1928, showed the slightest possible trace of albumin with 1 to 3 leukocytes per high-power field and no casts. The blood pressure was not elevated.

She was not seen again until October 27, 1930, when the blood pressure was 220 systolic, 126 diastolic. The urine showed the slightest possible trace of albumin, and the sediment contained no red cells or leukocytes but an occasional granular cast.

The patient continued to run a high blood pres-

*A series of selected case histories by members of the section will be published early. Comments and questions by subscribers are solicited and will be discussed by members of the section.

sure until she died suddenly of a cerebral hemorrhage in 1935

Comment This case illustrates perfectly the conservative treatment of pyelitis in 1923. The treatment consisted of rest in bed, forced fluids and urotropin and sodium bicarbonate by mouth, and only very infrequently did the condition become so grave that interruption of the pregnancy was entertained. It was often very difficult to get sufficient nourishment into these patients because not only did the continued fever do away with all desire for food but persistent vomiting often resulted in the loss of much of the food ingested. The intravenous injection of glucose solution was not a common form of medication, and subcutaneous injections of saline were frequently necessary to maintain a normal fluid intake. It was the common belief then that when pyelitis occurred during pregnancy it spontaneously cleared after the baby was delivered, that subsequent attacks of pyelitis were uncommon and that true kidney damage as a result of pyelitis did not occur. All this we now know to be untrue. It is fair to infer that the sustained blood pressure which subsequently developed was based on damaged kidneys as a result of the pyelitis. Pyelitis during pregnancy is not the innocuous disease that it was considered to be fifteen or twenty years ago.

CHOOSING A CAMP FOR YOUR CHILD*

The camping season will soon be here, and the important question for parents to decide is whether they want their children to go to camp this summer. Those who have sent their children in the past will have little difficulty in making this decision if their children have not passed the camping age. These parents realize that the benefits which their children receive from camp are far greater than those they would receive at home, regardless of whether they live in the city or the country.

All parents should know what summer camps attempt to do for their children. Camps in reality are like schools and teach children how to live happily together under delightful natural surroundings. They are not merely places where parents can send their children to avoid the heat of the summer. They are character-building institutions where boys and girls learn principles of right and wrong through the example and leadership of their counselors. Instead of learning to read and write, they learn the various summer sports, such as swimming and boating, and craftsmanship. The modern camp is giving up the strict regimentation of school life, and although there is discipline, boys and girls are allowed to pursue their own interests. Children now may engage in projects of their own, which often give them the inspiration of accomplishment. One cannot pass over lightly the great part that the country, with its beautiful trees, its lakes and all the mysteries of nature, gives to children. The love of

the great out-of-doors which New England affords so liberally is something to which every child is entitled.

A word should be said about the general camp situation in Boston and New England. In the first place we are situated in one of the most ideal localities for camps, with the ocean, lakes and country at our very doorsteps. The unfortunate part about it is that there are still far too few camps for all the boys and girls who ought and want to go to one. There are in general two classes of camps, which might well be compared to public and private schools. The public ones are often called organization camps because they are financed and directed by public spirited men and women who wish to give camping experience to all boys and girls without respect to the finances of their parents. These people believe that camp life should be afforded to all children, just as education is given to all children. There are about seventy such camps, some large, some small, which emanate from Boston alone. Some of these are the scout camps, the Salvation Army Camp, the East Boston Settlement House Camp, and the News Boys' Camp. All these and many others have been examined, visited and revisited by people interested in camps for children, and many friendly criticisms and suggestions have been made, with the result that the standards have been greatly improved, that is, there are better buildings, councilors, programs and food and a longer stay in camp.

Some of us are very much interested in the physical side of camp life. We do not believe that this is more important than programs and personnel, but we do believe that no camp should take the responsibility of caring for children without providing adequately for certain essential physical conditions. These include the proper situation for the camp site, proper sewage disposal and drinking water free from contamination. These matters cause us little thought in our cities because public health departments and sanitary engineers have made them a part of our life, but camps must have the same systems, which are expensive essentials. In some states, sewage disposal and pure water supplies are controlled by laws, in others only superficial supervision is given, while still others are entirely under the direction of the camp authorities. We believe from our studies that most New England camps have safe water and proper sewage disposal plants, and we are not aware that any diseases among campers have arisen from these sources.

The camp buildings should provide proper shelter against cold and rainy weather, proper space for sleeping and adequate recreational rooms. One of the most important buildings is the kitchen, and there should be good refrigeration facilities.

The diet for campers is a subject that concerns us a great deal. It is true that many children remain in camp only two weeks, so that little harm can come from poorly balanced and insufficient food, but even so, the diet should be perfect in order to give the camper the best results. We have not established the ideal menus for camps, and more work must be given this subject. The most expensive diet certainly is not always the best. We have sampled a good many camp diets, and although there are exceptions, most camps are providing good food for the children. Some of the camps have used local raw milk in the past, but pasteurized milk is much more desirable and now, I understand, is prescribed by law for all campers in one New England state.

Among the important physical requirements for camps which should interest every parent is proper medical supervision. Health in a camp is not only important for each camper but for the group. If one child has an in-

*A Green Lights to Health broadcast given by Dr. Warren R. Sisson on Tuesday April 9 and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

fection it may spread to others. This means, first of all that every camp should have a physician in residence or near enough so that he can make regular visits and supervise and instruct the camp staff in medical matters. A qualified nurse should live in every camp and be able to care properly for any sick camper and attend to minor injuries. Her presence adds greatly to the security of your children while they are away from you.

All campers should have a physical examination before going to camp to be certain that they are free from any infection and to find out if they are qualified for camp life. They should all be examined again on arrival in camp in order that every child's physical condition may be known first hand to the camp physician and to the director and his staff. Parents should also know that these physical examinations are important for all the staff and food handlers, as this gives added protection to the children's health.

Q How shall I go about selecting a camp for my two girls, aged ten and twelve?

A. That is just the question hundreds of mothers are asking, regardless of the type of camp. You may not know that there is a camp division of the Boston Council of Social Agencies at 80 Federal Street (LIB 8515)

Q Is this a directory for the organization camps?

A. Yes, and anyone may call up there to find out all about them. The secretary of this office will tell you about the camps and where to apply

Q Will he know whether these camps have fine counselors and good food for my girls?

A. Yes, because he has visited most of them.

Q What do you think is the most important thing to consider in selecting a camp for my girls?

A. You have asked me a very hard question but I believe if a camp has a good director who is always on the job his camp will be suitable for your children.

Q But how can I see the director and how can I tell if he knows how to manage a good camp?

A. Many times you can see the director. This is always true of the private camps and you can always ask your friends and their children who have been to camp about the director. If a camp has a good reputation among campers, it generally means that the director is good.

Q In selecting a camp should I inquire into all these things which you have mentioned such as pasteurized milk, refrigeration, a camp doctor and nurse?

A. Yes, I think you should ask about some of these things at least. If they have these essentials they will have the rest. Furthermore, if you ask these questions it will emphasize the importance of high standards for the successful future of their camps.

Q One of my girls has had a great many colds this past winter. Do you think she ought to go to a seashore camp or to one in the mountains?

A. I do not believe it really makes much difference. The important thing is to select a well run camp.

Q If I or one of my friends could afford to pay the full camp fee or tuition of a private camp, how would you select the proper one?

A. I think I should use the same rules. There is a directory for private camps, published by the American Camping Association in Chicago, but it will not help you much. I am certain that I should not select a camp on

social grounds—as many people do. I should ask my physician, a teacher I respect in my child's school or some friend who knows about camps.

If you start now to investigate the camps available to you you will find a good one for your children and they will have one of the best summers in their lives and be healthier, happier and more useful people in later life.

DEATH

LOVELL—MARTHA E. LOVELL, M.D., of Boston, died April 22.

Born in Ludlow, Vermont, she received her education at Black River Academy and obtained her degree from the Woman's Medical College of Pennsylvania in 1899. Dr. Lovell served her internship at the New England Hospital for Women and Children.

She was staff physician of the Massachusetts Society for the Prevention of Cruelty to Children for thirty-two years having become associated with that organization in 1906.

Among her affiliations were memberships in the Massachusetts Medical Society and the American Medical Association.

A sister Dr. Lucinda Lovell, and three brothers survive her.

MISCELLANY

ASSOCIATED HOSPITAL SERVICE CORPORATION

The increasing financial soundness of the Blue Cross of Massachusetts is indicated in its annual statement for 1939 which was recently released by the executive director Mr. R. F. Cahalane. The organization started 1939 with a deficit of \$7,252.84 and ended with a surplus of \$152,359.73 according to the statement. Over 76 per cent of the earned income, or \$1,109,425.28 was paid out for hospital service to subscribers during the year. Within this year the accrual method of accounting for earned income was adopted, the statement explained.

General operating costs were 87 per cent and the cost of acquiring new members, servicing accounts and conducting a public education program was 2.5 per cent, making a total of 11.2 per cent of earned income for administration and operation. "This is one of the lowest operating costs among the sixty service plans now approved by the American Hospital Association," Mr. Cahalane declared. "Operating costs are kept at this low level because all employees of the Blue Cross, including staff representatives, work on a salary basis with no commissions or bonuses paid," he explained.

In commenting on the newly acquired surplus or reserve fund Mr. Cahalane said "Our experience last year with an epidemic of respiratory infection, when it was necessary to make deductions on hospital bills, showed us that it was increasingly desirable to create a reasonable reserve to provide against any such future emergency. When the reserve fund is deemed sufficient, further surplus will be returned to subscribers in the form of added benefits or decreased membership rates. The Blue Cross has repaid its member hospitals half the amount of the deductions made last spring and expects to pay the remainder after the winter months have passed. The original loan for initial working capital was repaid in December 1938."

He added "During two and a half years of operation we have forged steadily ahead, in spite of a few growing pains. The number of subscribers enrolled has exceeded all estimates made at the beginning. We have every reason to look ahead to substantial growth and the extension of

Blue Cross service to larger numbers of citizens, particularly those in the lower income groups"

* * *

The balance sheet, as of December 31, 1939, is as follows

| ASSETS | |
|--------------------------------------|--------------|
| Cash in banks and on hand | \$488,935 65 |
| Accounts receivable | 49,099 01 |
| Deposits in savings banks | 25,314 97 |
| Total assets | \$563,349 63 |
| LIABILITIES AND RESERVES | |
| Reserve for hospitalization expenses | \$179,554.91 |
| Accounts payable | 1,484 20 |
| Unearned subscriber payments | 229,950 79 |
| Operating reserves | 152,359 73 |
| Total liabilities and reserves | \$563,349 63 |

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR FEBRUARY, 1940

| DISEASES | FEBRUARY 1940 | FEBRUARY 1939 | FIVE YEAR AVERAGE* |
|--------------------------|------------------|------------------|-----------------------|
| Anterior poliomyelitis | 2 | 0 | 0 |
| Chicken pox | 1705 | 1347 | 1363 |
| Diphtheria | 15 | 12 | 22 |
| Dog bite | 648 | 580 | 534 |
| Dysentery bacillary | 41 | 23 | 7 |
| German measles | 60 | 66 | 511 |
| Gonorrhea | 291 | 285 | 383 |
| Lobar pneumonia | 581 | 616 | 675 |
| Measles | 1193 | 3819 | 2541 |
| Meningococcus meningitis | 5 | 7 | 11 |
| Mumps | 668 | 823 | 968 |
| Paratyphoid B fever | 0 | 2 | 1 |
| Scarlet fever | 511 | 890 | 984 |
| Syphilis | 405 | 343 | 424 |
| Tuberculosis pulmonary | 205 | 148 | 212 |
| Tuberculosis other forms | 34 | 12 | 24 |
| Typhoid fever | 6 | 5 | 5 |
| Undulant fever | 4 | 2 | 3 |
| Whooping cough | 534 | 1015 | 895 |

*Based on figures for preceding five years

RARE DISEASES

Anterior poliomyelitis was reported from Boston, 2, total, 2

Diphtheria was reported from Andover, 1, Boston, 3, Lawrence, 1, Methuen, 2, Peabody, 2, Saugus, 1, Shirley, 1, Somerville, 2, Worcester, 1, Wrentham, 1, total, 15

Dysentery, bacillary, was reported from Boston, 1, Cambridge, 4, Lowell, 1, Lynn, 2, Medfield, 10, Merrimac, 1, Pittsfield, 8, Salem, 8, Westfield, 5, Wrentham, 1, total, 41

Infectious encephalitis was reported from Merrimac, 1, total, 1

Malaria was reported from Watertown, 1, total, 1

Meningococcus meningitis was reported from Boston, 1, Falmouth, 1, Holyoke, 1, North Adams, 1, Tewksbury, 1, total, 5

Pfeiffer bacillus meningitis was reported from Hanson, 1, total, 1

Septic sore throat was reported from Andover, 1, Belmont, 1, Boston, 2, Cambridge, 5, Danvers, 1, Fall River, 2, Greenfield, 2, Haverhill, 2, Merrimac, 1, New Bedford, 1, Peabody, 1, Revère, 1, Somerville, 1, Watertown, 1, Wrentham, 1, total, 23

Trachoma was reported from Boston, 1, total, 1

Trichinosis was reported from Boston, 1, total, 1

Typhoid fever was reported from Arlington, 1, Brockton, 1, New Bedford, 1, Salem, 1, Swampscott, 1, Weymouth, 1, total, 6

Undulant fever was reported from Brookfield, 1, Haverhill, 1, Stockbridge, 1, Worcester, 1, total, 4

Chicken pox had its highest February incidence since 1916

The reported incidence of dog bites was slightly above the five-year average, with the highest February incidence since 1928

There is a continuation of the slight upward trend of bacillary dysentery, primarily of the Sonne type.

Diphtheria was reported at expected levels, the slow upward trend of the past five months being broken.

Scarlet fever had its lowest February incidence since 1906

German measles, gonorrhea, syphilis, measles and mumps were reported well within the five year average.

Lobar pneumonia, meningococcus meningitis and whooping cough were reported at expected levels.

There was nothing remarkable in the reported incidences of anterior poliomyelitis, paratyphoid B fever, tuberculosis, typhoid fever and undulant fever

MAINE NEWS

MAINE MEDICAL ASSOCIATION

The eighty-eighth annual session of the Maine Medical Association will be held at Rangeley Lakes, Sunday, Monday and Tuesday, June 23, 24 and 25

Monday afternoon will again be devoted to a clinic-pathological discussion. An added feature will be a discussion of the use of sulfapyridine and allied compounds by a recognized authority. In the evening the ever popular dinner-dance is planned, and Mr V W Peterson, of the Federal Bureau of Investigation, is to speak.

Tuesday afternoon, Drs Henry Marble and Timothy Leary, of Boston, and Dr P L B Ebbett, of Houlton, are to talk on subjects of general interest. Governor Barrows will speak following the banquet in the evening as will Dr Morris Fishbein, editor of the *Journal of the American Medical Association*, for the second successive year. The title of the latter's talk will be "Quackery in Medicine"

MAINE PUBLIC HEALTH ASSOCIATION

The Maine Public Health Association held its 1940 Campaign for the Prevention of Tuberculosis during the month of April, for the thirteenth consecutive year. The slogan was "The X ray Reveals Tuberculosis before the Symptoms Appear," the object being to teach the importance of using the x ray as a necessary tool in securing an early and correct diagnosis.

Especially co-operative agencies were the Maine Federation of Women's Clubs, the Maine Medical Association, district health officers, Red Cross agencies, milk dealers, various educational institutions, and newspapers. Broadcasts were arranged, women's clubs distributed literature, milk dealers used bottle caps carrying the slogan, industries enclosed literature in pay envelopes, announcements were made through the churches on Early Diagnosis Sunday. Inmates in sanatoriums who were able were asked to write letters to friends urging health check-ups with x ray studies.

WOMEN'S FIELD ARMY OF MAINE

Prior to 1937 no financial provision had been made either by the State or by the hospitals, for the treatment of needy tumor patients. Realizing this fact the Women's Field Army of Maine established the Dr Joseph W

Scannell Memorial Fund for the treatment of indigent tumor patients by x-rays or radium—two of the most expensive and essential items in the control of the disease.

Since the inauguration of the Women's Field Army in 1937 records show a constant increase in the attendance at the tumor clinics, which are conducted at the Maine General Hospital (Portland) the Eastern Maine General Hospital (Bangor) the Thayer and Sister's hospitals (Waterville) and the Central Maine General and St. Mary's General hospitals (Lewiston). In 1937 to 1938 600 patients were examined at the six clinics of this number the Women's Field Army assisted in financing the treatments for 147. From May 1 1938 to May 1 1939 approximately 950 patients were examined at the clinics, 309 cases being assisted by the Women's Field Army. From May 1 1939 to May 1 1940 750 patients were examined, and 222 cases were assisted by the Women's Field Army. Of the number of patients coming to the clinics a greater proportion are coming early and are therefore curable cases.

The personnel of the Women's Field Army is as follows: state commander secretary 16 vice-commanders, 16 deputy vice-commanders 142 majors of districts, who secure captains in the cities and towns, and a publicity director (part time). A million pieces of literature are distributed and 2000 booklets and letters to the doctors and ministers of Maine. A goal of \$25,000 has been set for the 1940 campaign. The Maine Legislature has appropriated \$5000 for the fiscal years ending June 30 1940 and June 30 1941.

CORRESPONDENCE

MEDICAL SPECIALISTS

To the Editor: Your comments on the recently issued *Directory of Medical Specialists* and on the general subject of certification of specialists appearing in your issue of March 28 were of great interest to all of us concerned with this movement.

Your criticisms were, as usual in your editorial columns constructive ones, and I desire only to clarify certain points about which there seems to be some misunderstanding.

The general impression seems to prevail suggested again in your editorial that the special examining boards require all applicants for certification to obtain their training solely by prolonged periods of hospital residency services, amounting to from three to seven years of such service. This is not correct, and the preceptorship or assistantship method of training is acceptable to all the boards.

A quotation from the requirements of the American Board of Surgery reads as follows: "One may secure the necessary training as an assistant to an accredited surgeon, provided suitable facilities for the education of the candidate are offered." Combinations of hospital residency and staff assistantship trainings are also entirely acceptable, the minimum period of such training in general surgery being specified as five years.

Your editorial suggests that two years of hospital training after the intern year should be sufficient for this but the Board of Surgery believes the surgeon with such relatively scanty training would lack maturity of judgment and experience and would not be sufficiently safely grounded to warrant his being certified as a recognized specialist in general surgery.

The regulations of the American Board of Obstetrics and Gynecology state: "As a substitute for special [hos-

pital] training service with a qualified preceptor may be acceptable. The time [required] for this type of training will vary with the amount of work done with the preceptor [but must be at least three years]."

It is clear from the foregoing that dispensary staff appointments, as well as assistant or associate staff appointments in accredited hospitals under proper supervision, may be utilized by candidates as fulfilling training requirements when opportunities for the more intensive residency system training have been lacking.

As one who has served for ten years as an examiner for one of these boards, may I refute that "the examiners have on some occasions been more interested in limiting the number of certificate holders than in determining the fitness of the individual candidate?" Such comments have been heard from thoughtless or unsuccessful candidates but are entirely unjustified. On the contrary every Board strives for the opposite, namely to approve as many as can really qualify. Far more time is taken with questionable candidates than with any others. Such men are given every additional opportunity to qualify when their first showing has been uncertain or poor by being questioned by several rather than by only one set of examiners.

I have repeatedly sat with other examiners and heard the candidate asked a controversial question about which the examiners themselves disagreed regarding the answer. The candidate was told this and that we wanted to know his opinion and by what reasoning he came to his conclusions. Under such circumstances I have never seen a candidate failed on his answer merely because it disagreed with the opinion held by one or two of us provided his knowledge of the subject and his lines of reasoning justified his opinion. This, to my mind, is a real type of examination.

The *Directory of Medical Specialists* was prepared primarily for the medical profession as a means of distinguishing by certification formally qualified specialists from others whose claims to be specialists may be valid or merely their own self-appraisals. We hope the profession will use the directory rather than the lay public, as reference of patients should be by the former not by the latter.

However and as you suggest, the public is certain to be come actively aware of this movement to elevate the practice of the medical specialties. In this instance, the medical profession is once again trying to lead rather than to follow the lay public in the better care of its sick population.

PAUL TITUS, M.D. Secretary
Advisory Board of Medical Specialists.

1015 Highland Building,
Pittsburgh Pennsylvania.

ULTRA VIOLET CURTAINS

To the Editor: The editorial "Ultra Violet Curtains" in the April 11 issue of the *Journal* might have more strongly emphasized the epidemiologic point that the reservoir for respiratory infection is not the atmosphere, but the nasopharyngeal membranes of the people who breathe it. Like wise in the Wells experiment, the reservoir is the atomizer not the air it pollutes. Sterilized air is just as good a vehicle between individuals as is polluted air. This concept is presented in a report on the epidemiology of respiratory infection in the *Bulletin of the New England Medical Center* 2:290-94 (1940).

DWIGHT O'HARA, M.D.

416 Huntington Avenue,
Boston, Mass.

LICENSE REVOKED

To the Editor The license of Dr Herbert N Gerardell, 110 Paris Street, East Boston, Massachusetts, was revoked by the Board of Registration in Medicine on April 18 because of gross misconduct in the practice of his profession

STEPHEN RUSHMORE, M D, *Secretary*,
Board of Registration in Medicine.

State House,
Boston

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION, COUNCIL ON PHARMACY AND CHEMISTRY

To the Editor In addition to the articles enumerated in our letter of February 7 the following have been accepted

Abbott Laboratories

Tablets Barbitol—Abbott, 5 gr
Capsules Estriol—Abbott, 0.24 mg

Drug Products Co

Hyposols Bismuth Subsalicylate in Oil, 60-cc.-size vial

Gane's Chemical Works

Pentobarbital Sodium

Gilliland Laboratories, Inc.

Antipneumococcic Rabbit Serum, Type I
Antipneumococcic Rabbit Serum, Type II
Antipneumococcic Rabbit Serum, Type V
Antipneumococcic Rabbit Serum, Type VII
Antipneumococcic Rabbit Serum, Type VIII

Hille Laboratories

Unguentum Lunosol, 5 per cent—Hille
Unguentum Lunosol, 10 per cent—Hille

International Vitamin Corporation

I V C Halibut Liver Oil with Viosterol (A R P I Process) in Oil
Capsules I V C Halibut Liver Oil with Viosterol (A.R.P.I Process) in Oil, 3 min

Eli Lilly & Co

Pulvules Sulfanilamide, 0.13 gm (2 gr)
Pulvules Sulfanilamide, 0.325 gm (5 gr)

Mallinckrodt Chemical Works

Hippuran
Hippuran (Crystals) 12-gm., 100-gm. and 500-gm. bottles
Sterile Solution Hippuran, 25 cc.
Magnesium Trisilicate—Mallinckrodt

Wm. S Merrell Company

Ampules Sodium Cacodylate—Merrell, 0.05 gm ($\frac{3}{4}$ gr), 1 cc.
Ampules Sodium Cacodylate—Merrell, 0.1 gm ($1\frac{1}{2}$ gr), 1 cc.
Ampules Sodium Cacodylate—Merrell, 0.2 gm (3 gr), 1 cc.
Ampules Sodium Cacodylate—Merrell, 0.324 gm (5 gr), 1 cc.
Ampules Sodium Cacodylate—Merrell, 0.454 gm (7 gr), 1 cc.

National Drug Company

Tuberculin Intracutaneous for Mantoux Test, one 1-cc ampule (single test) package
Tuberculin Intracutaneous for Mantoux Test, one 5-cc. ampule (single test) package

Parke, Davis & Co

Tablets Sulfapyridine—P.D. & Co., 0.5 gm. ($7\frac{1}{2}$ gr)
Bismuth Salicylate in Oil—P.D. & Co., 30-cc. bottle
Bismuth Salicylate in Oil—P.D. & Co., 500-cc. bottle

Smith, Dorsey Company

Capsules Ephedrine Sulfate, 0.048 gm. ($\frac{3}{4}$ gr)
Capsules Ephedrine Sulfate, 0.025 gm. ($\frac{3}{8}$ gr)

E. R. Squibb & Sons

Antipneumococcic Rabbit Serum, Type I

Frederick Stearns & Co

Stearns Ascorbic Acid Tablets, 25 mg

The Upjohn Co

Ampules Sodium Cacodylate—Upjohn, 0.05 gm ($\frac{3}{4}$ gr), 1 cc.
Ampules Sodium Cacodylate—Upjohn, 0.1 gm ($1\frac{1}{2}$ gr), 1 cc.
Ampules Sodium Cacodylate—Upjohn, 0.2 gm (3 gr), 1 cc.
Ampules Sodium Cacodylate—Upjohn, 0.32 gm (5 gr), 1 cc.
Ampules Sodium Cacodylate—Upjohn, 0.45 gm (7 gr), 1 cc.
Ampules Sodium Cacodylate—Upjohn, 0.97 gm (15 gr), 2 cc.

PAUL NICHOLAS LEECH, *Secretary*,

535 North Dearborn Street,
Chicago, Illinois

NOTICES

JOSEPH H PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9-10 a.m.

MEDICAL CONFERENCE PROGRAM, MAY-JUNE

Friday, May 3—A Review of Diabetes. Dr Elliott I Joslin.
Saturday, May 4—Hospital Case Presentation. Dr James E Paullin
Thursday, May 9—Research in the Control of Cancer Pain with Special Reference to the Newer Morphine Derivatives. Dr Lyndon E Lee.
Friday, May 10—The Management of the Pernicious Anemia Patient with Neural Disturbance. Dr William P Murphy
Saturday, May 11—Hospital Case Presentation. Dr S. J. Thannhauser
Tuesday, May 14—Studies in Urobilinogen Metabolism. Drs Karl Singer and Edward B Miller
Wednesday, May 15—Hospital Case Presentation. Dr S J Thannhauser
Thursday, May 16—Huntington's Chorea. Dr A. Warren Stearns
Friday, May 17—Obesity. Dr Mark Falcon Lesser.
Saturday, May 18—Hospital Case Presentation. Dr S. J. Thannhauser

Tuesday May 21—Arthuric Clinic. Dr. Walter Bauer
 Wednesday, May 22—Hospital Case Presentation. Dr.
 S. J. Thannhauser
 Thursday, May 23—Cardiac Clinic. Drs. H. Magen-
 dantz and A. Zetlin.
 Friday May 24—The Origin, Diagnosis and Treatment
 of Pituitary Body Tumors. Dr. Oscar Hirsch.
 Saturday May 25—Hospital Case Presentation. Dr.
 S. J. Thannhauser
 Tuesday May 28—Personality Factors in Internal Medi-
 cine. Dr. C. Macfie Campbell.
 Wednesday May 29—Hospital Case Presentation. Dr.
 S. J. Thannhauser
 Friday May 31—Changes in the Circulation Produced
 by Poor Postural Adaptation. Dr. Eugene A. Stead, Jr.
 Morning conferences will be resumed on Tuesday, Oc-
 tober 1, 1940.

CARNEY HOSPITAL

The monthly meeting of the John T. Bottomley Society
 will be held at the Out Patient Department of Carney Hos-
 pital on Tuesday, May 7 at 11.30 a.m. Dr. S. Tracy
 Clarke will speak on the subject "Medical Ophthalmology"
 Physicians and students are cordially invited to attend.

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held
 at the Boston City Hospital on Wednesday May 8, at
 12 o'clock noon in the Pathological Amphitheater

HARVARD MEDICAL ALUMNI ASSOCIATION

The annual meeting and dinner of the Harvard Medi-
 cal Alumni Association will take place on Wednesday
 June 12, at 7.15 p.m. at the Harvard Club of New York
 during the annual session of the American Medical Asso-
 ciation. The speakers will be President James B. Conant
 and Drs. C. Sidney Burwell, Lincoln Davis and Cornelius
 P. Rhoads. Notices with return cards will be sent to all
 alumni in advance.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent
 Brigham Hospital will be held on Wednesday May 8
 from 2 to 4 p.m. Drs. Robert Zollinger and E. S. Emery
 will speak on "Diarrhea and Constipation."
 Physicians and students are cordially invited to attend.

SOUTH BOSTON MEDICAL SOCIETY

The annual dinner of the South Boston Medical Society
 will be held at the Harvard Club on Monday May 20 at
 7.00 p.m. In celebration of its thirty-fifth anniversary the
 history of the society will be read

Reservations for the dinner may be made by telephoning
 Dr. John T. Foley SOU 1617

BOSTON LYING-IN HOSPITAL

The Journal Club will hold its next meeting at
 the Boston Lying-In Hospital on Tuesday May 14 at
 8.15 p.m. Dr. George L. Streeter of the Carnegie Insti-
 tution, Washington District of Columbia, will speak on
 "Important Factors in Development as Revealed by Early
 Stages of the Macaque Embryo."
 Physicians and students are cordially invited to attend.

NEW ENGLAND PEDIATRIC SOCIETY

The next meeting of the New England Pediatric Society
 will take place on Wednesday May 15. The clinical
 presentation will be held at the Massachusetts General
 Hospital and all the other events at Longwood Towers,
 Brookline.

PROGRAM

- 4.00 Clinical presentation by staff at Massachusetts
 General Hospital.
- 6.15 Refreshments.
- 7.00 Dinner
- 8.15 Symposium on Adolescence.
 Psychological Disturbances and Adjustments
 of Adolescence. Dr. James S. Plant, New
 ark, New Jersey
 Scholastic Difficulties of Adolescence. Mr.
 C. E. Allen.
 Disturbances of Menstruation and Ovulation
 of Adolescence. Dr. John Rock.

Physicians are cordially invited to attend the clinical
 meeting and the symposium.

MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

The annual meeting of the Massachusetts Society of Ex-
 amining Physicians will be held at the Copley-Plaza Ho-
 tel Boston, on Wednesday, May 8. Dinner will be served
 at 6.30 p.m. at \$2.50 per plate.

PROGRAM

- Business.
- Election of officers.
- Election of candidates for membership.
- The Treatment of Dupuytren's Contracture on the
 Second Surgical Service of the Carney Hospital.
 Dr. William E. Browne.
- The Work of the Board of Registration in Medicine.
 Dr. Francis R. Mahony
- A Quarter Century Experience with a Benefit Plan
 for Twenty Thousand Employees. Dr. Daniel
 L. Lyoch.

ASSOCIATION OF MILITARY SURGEONS

The Colonel Williams Chapter of the Association of
 Military Surgeons of the United States will hold its second
 meeting of the year at the Worcester State Hospital,
 Worcester on Friday May 10 at 8.00 p.m. Dr. William
 Malamud will speak on the subject "The Treatment of
 the Neurosis in General Practice." The meeting will be
 preceded by the election of officers for the coming year

AMERICAN COLLEGE OF CHEST PHYSICIANS

The sixth annual meeting of the American College of
 Chest Physicians will be held June 8, 9 and 10 at the Hotel
 Baltimore, New York City. The first day Saturday,
 June 8 will be devoted to papers by members of the
 Medical Section with an "Information Please" luncheon.
 On Sunday June 9 an administrative session will be held
 in the morning and a meeting of the Surgical Section
 in the afternoon, with another "Information Please"
 luncheon. On Monday June 10 clinics will be given at
 the Lenox, Kings County and Montefiore hospitals in the

morning and the Sea View, Bellevue and Kingston Avenue hospitals in the afternoon

Detailed information in regard to the program may be obtained from Dr. George Ornstein, 965 Fifth Avenue, New York City

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, MAY 5

SUNDAY MAY 5

8 15 p.m. Boston Doctors Symphony Orchestra concert Jordan Hall

TUESDAY MAY 7

*11 30 a.m. Medical Ophthalmology Dr. S. Tracy Clarke. John T. Bottomley Society Carney Hospital
6 30 p.m. Greater Boston Medical Society Hotel Kenmore Boston

WEDNESDAY MAY 8

12 m. Monthly clinicopathological conference. Boston City Hospital
*2-4 p.m. Diarrhea and Constipation Drs. Robert Zollinger and E. S. Emery Peter Bent Brigham Hospital
6 30 p.m. Massachusetts Society of Examining Physicians. Copley Plaza Hotel Boston

THURSDAY MAY 9

*9-10 a.m. Research in the Control of Cancer Pain with Special Reference to the Newer Morphine Derivatives Dr. Lyndon E. Lee. Joseph H. Pratt Diagnostic Hospital

FRIDAY MAY 10

*9-10 a.m. The Management of the Pernicious Anemia Patient with Neural Disturbance Dr. William P. Murphy Joseph H. Pratt Diagnostic Hospital

SATURDAY MAY 11

*9-10 a.m. Hospital case presentation Dr. S. J. Thannhauser Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

MAY 3-31—Medical Conference Program Joseph H. Pratt Diagnostic Hospital Page 780

MAY 9—Pentucket Association of Physicians 8 30 p.m. Hotel Bartlett Haverhill.

MAY 10—Association of Military Surgeons Page 781

MAY 10-18—American Scientific Congress Page 1043 issue of December 28

MAY 13—United States Pharmacopoeial Convention Page 202 issue of February 1

MAY 14—South End Medical Club Page 736 issue of April 25

MAY 14—Boston Lying in Hospital Page 781

MAY 15—New England Pediatric Society Page 781

MAY 20—South Boston Medical Society Page 781

MAY 21—St. Francis Hospital (Hartford) alumni Page 737 issue of April 25

MAY 21-22—Massachusetts Medical Society Annual meeting Copley Plaza Hotel Boston

JUNE 4-6—National Gastroenterological Association Page 737 issue of April 25

JUNE 4-7—American Association of Industrial Physicians and Surgeons Page 654 issue of April 11

JUNE 7-8—American Heart Association Page 469 issue of March 14

JUNE 7-10—American Board of Obstetrics and Gynecology Page 608 issue of April 4

JUNE 8 and 10—American Board of Ophthalmology Page 719 issue of November 2.

JUNE 8-10—American College of Chest Physicians Page 781

JUNE 10-14—American Medical Association. Annual meeting New York City

JUNE 10-14—American Physicians Art Association Page 332 issue of February 22

JUNE 12—Harvard Medical Alumni Association Page 781

JUNE 23-25—Maloc Medical Association Annual meeting Rangeley Lakes.

OCTOBER 8-11—American Public Health Association Page 655 issue of April 11

OCTOBER 21—American Board of Internal Medicine Inc. Page 369 issue of February 29

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH

MAY 8—Annual meeting Salem Country Club Peabody

FRANKLIN

MAY 14—Franklin County Hospital Greenfield.

HAMPSHIRE

MAY 8 at 11 30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

MAY 15, at 12 15 p.m. at the Unicorn Country Club Stoneham.

MIDDLESEX NORTH

JULY 31

OCTOBER 30

PLYMOUTH

MAY 16—Lakeville State Sanatorium Middleboro.

WORCESTER

MAY 8—Worcester Country Club Dinner at 6:30 p.m. followed by a business and scientific meeting

BOOKS RECEIVED FOR REVIEW

The Hypothalamus and Central Levels of Autonomic Function Proceedings of the Association for Research in Nervous and Mental Disease, December 20 and 21, 1939, New York. Vol. XX. 980 pp. Baltimore: Williams & Wilkins Co., 1940 \$10.00

Gynecologic Operations and Their Topographic Anatomic Fundamentals Heinrich Martius. Translated and edited by W. A. Newman Dorland. 486 pp. Chicago: S. B. Debour, 1939 \$10.00

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BOOK REVIEW

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This book lists in detail the criteria for diagnosis of heart disease in all its aspects including the etiology, anatomical, physiological, radiological, electrocardiographic and pathological. It has been adopted and distributed by the American Heart Association and is recommended by the New England Heart Association whose predecessor the Boston Association for the Prevention and Relief of Heart Disease, pioneered in this field nearly twenty years ago.

The present volume contains important changes to conform with the *Standard Classified Nomenclature of Disease*, and a section on "Pathological Diagnosis" has been added.

The appearance of a fourth edition in twelve years is some indication of its popularity among cardiologists and teachers, who have welcomed the contribution it has made to clarity of expression through uniformity of criteria.

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ACUTE APPENDICITIS AS A COMPLICATION OF CARCINOMA OF THE CECUM

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BOSTON

THAT obstruction of the lumen of the appendix may be the etiologic factor in acute appendicitis is a well recognized fact. In a recent study of 3400 cases of acute appendicitis, Collins¹ found such obstruction a causative factor in 50 per cent of the entire series.

A neoplasm of the cecum may obstruct the lumen of the appendix at the point where it enters the wall of the cecum and produce an acute inflammatory process in the appendix. In these cases the clinical picture of acute appendicitis obscures the underlying process, so that the presence of the neoplasm is usually not detected until some time later. This delay may allow the growth to become inoperable or incurable in the interval.

Two recent cases have drawn our attention to this condition, which is not a common one. We have succeeded in finding only 6 additional cases in the literature. In 4 of these the diagnosis of acute appendicitis was established at operation, while in the other 2 it was based on the clinical picture, which was considered conclusive. In all of them the diagnosis of carcinoma of the cecum was later proved.

Shears,² writing in 1906 reported the case of a woman of fifty-two who had two attacks of acute appendicitis, treated without operation. Later when laparotomy was performed a mass, which proved to be carcinoma, was found entirely surrounding the base of the appendix.

Nothing further on this subject is encountered in the literature until 1932, when Mayer³ described 2 cases. One was that of a woman of seventy who had an acutely inflamed but unruptured appendix, obstructed at its base by a carcinoma of the cecum. The other patient was a man of sixty-five with a gangrenous and perforated appendix who also had an underlying carcinoma of the cecum.

In 1933 Parker and Rosenthal⁴ reported a case of appendiceal abscess in a man of forty-four, who died of sepsis before a resection could be undertaken. He had a carcinoma of the cecum obstructing the orifice of the appendix.

Banks and Green,⁵ writing in 1935 reported the case of a man of sixty-three who had an appendiceal abscess which subsided under conservative treatment. A resection of the right colon was done, and an annular scirrhous carcinoma of the cecum surrounding the orifice of the appendix was found.

The latest article describing the coexistence of these two conditions is that of Cook.⁶ His patient was a woman of thirty-eight who had acute appendicitis with abscess, complicating an adenocarcinoma of the cecum.

In spite of its apparent rarity, we feel justified in again calling attention to this combination of conditions. In each of the cases that we are reporting a delay of several months occurred between the first operation and the recognition of the actual underlying disease. Even at the time of the final operation, a definite diagnosis of malignant neoplasm could not be made by the roentgenologist. As in other forms of cancer, the only hope of cure in this condition lies in its early recognition before the growth has become inoperable because of local extension, or the condition incurable because of metastasis.

There are two distinct factors that mitigate against the recognition of the presence of carcinoma of the cecum as an underlying process in acute appendicitis. One is that it is not considered good surgical judgment to explore adjacent organs in the presence of an acute inflammatory process, such as acute appendicitis. The other is that an underlying neoplasm may be mistaken for the varying degree of induration of the wall of the cecum that may be present in acute appendicitis.

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CASE REPORTS

CASE 1 The patient, a 32-year-old man, had been operated on 4 months before admission. The surgeon who operated stated that acute appendicitis was present and that the cecum was normal. The appendix was removed. After operation the patient had symptoms, including pain in the right lower quadrant of the abdomen, that were thought to be due to subacute intestinal obstruction, and 1 month after the appendectomy an exploratory laparotomy was done. A kinking of the terminal ileum was found and freed, and what was thought to be an acute inflammatory process involving the terminal ileum and cecum was noted. Because of the marked change in the cecum in 1 month, it was thought that the process was not tuberculous in origin, and a diagnosis of regional ileitis and colitis was made.

The patient continued to have pain in the right lower quadrant, and he was admitted to the hospital for study. An indefinite mass could be felt in the right lower abdo-



FIGURE 1 Case 1

This section of the tumor shows a rapidly growing and poorly differentiated growth, classed as adenocarcinoma, Grade IV. The patient was alive and well three years after operation.

men, and an x ray examination by barium enema revealed a mass in the cecum that was thought to be a benign neoplasm. Examination of the stool on two occasions showed no occult blood. At operation a polypoid adenocarcinoma was found, filling the cecum and lower ascending colon. No local extension outside the bowel had occurred, and no metastatic disease was felt. An ileotransverse colostomy was performed with removal of the terminal ileum, cecum, ascending colon and part of the transverse colon.

The patient made an uneventful convalescence and was living and well 3 years after operation.

CASE 2 The patient, a 52-year-old surgeon, had had diarrhea for several years. A diagnosis of mild colitis had been made. Four months previous to admission he had an acute attack of abdominal pain and a gangrenous appendix perforated at the base was removed. Some induration of the cecum around the base of the appendix was noted. The wound had drained for 4 weeks and then closed, and had remained closed. After this, mild attacks began, consisting of abdominal discomfort, gas and slight elevation of temperature. The diarrhea persisted.

On admission a small, firm mass could be felt under

the appendectomy scar. The temperature was 99°F., and the white-cell count 9700. X ray examination by barium enema revealed disease in the region of the cecum, but its nature could not be determined. Stool examination showed no occult blood.

At operation a hard, movable growth was found in the cecum. There were extensive metastases to the regional



FIGURE 2 Case 2

This section of the tumor shows a fairly differentiated growth, classed as adenocarcinoma, Grade III. Extensive metastases were found at the time of operation, and the patient died three months later.

lymph nodes, and the liver was studded with many carcinomatous nodules. A resection of the right colon with an ileocolostomy was done, and the patient had a satisfactory though somewhat stormy convalescence. The primary tumor was removed in this case in the hope of relieving the patient's symptoms for the remaining months of his life. He made an uneventful recovery from the operation but failed rapidly after leaving the hospital, and died 3 months after the operation.

SUMMARY

Carcinoma of the cecum may obstruct the lumen of the appendix and cause acute appendicitis.

A report of 2 cases is added to the 6 previously reported in the literature.

In the presence of a definite acute appendicitis the underlying carcinoma of the cecum may be overlooked.

A delay of four months occurred in each of our cases between the first and final operations.

Even at the time of the last operation, a definite diagnosis of carcinoma of the cecum could not be made in either case by the roentgenologist.

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THE NATIONAL HEALTH ACT OF 1939*

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BOSTON

I HAVE accepted the very kind invitation to take part in this symposium on the Wagner Health Bill with some reluctance. I believe that I am listed as a proponent of the bill, and it is true that I am in sympathy with its main purposes as I interpret them, but I am not a proponent of the bill as it now stands.

I should like to discuss the present situation under three headings: Causes for Worry, "Definition of the Issue" and "Attitude toward the Proposed Health Legislation."

CAUSES FOR WORRY

Several years ago Dr. Olin West¹ is said to have made a statement the substance of which is as follows: The outstanding problem of the medical profession is the delivery of adequate scientific medical service to all people, rich and poor, at a cost that can be reasonably met by them in their respective stations in life. I believe that this statement is as true today as it was when Dr. West made it. The problem has not been solved, and it behooves the medical profession to worry about it and to continue to seek its solution. In my opinion the evidence is clear that a real need for improvement in medical care exists.

The existence of this need was revealed by the findings of the Committee on the Costs of Medical Care² in 1932. It is well to remember that these studies were made during the boom years of 1928, 1929 and 1930, a fact which suggests that in the opinion of this committee the need then existed, and it would appear that the present depression has only intensified, not created, this need. It is not likely to be satisfied even if economic conditions improve.

The mass of more or less confidential and personal opinion assembled by the impartial American Foundation Studies in Government,³ and published in two volumes entitled *American Medicine*. *Expert testimony out of court* also proves the existence of an uneven distribution of medical care and of wide gaps in its adequacy.

I know of no reason to doubt the essential accuracy of the recent investigation of the Federal Government into the incomes of its citizens.⁴ If these figures are reliable there are some 40,000,000

persons living in families whose total annual income is below \$900. These people are not paupers, but among them will be numbered most of the so-called medically indigent. It is true that this sum may be able to buy twice as much in some localities as it will in others. Nevertheless \$900 a year in any section would seem to leave little margin either for budgeting or for buying the best that medicine knows as to prevention, diagnosis and treatment of illness or injury, if any of the members of an average family of four are in need. It seems quite unfair to load this uncompensated burden on the backs of wearied practitioners, and unwise to expect any longer a weakened public to shoulder it.

Another cause for worry is what one may call the increasing "consumer demand." The appetite of the lay public for information concerning medical matters has become voracious. This is evidenced by the books, written by both doctors and laymen, that are being published—and widely sold—and by countless articles in popular magazines and the daily press. The proposals for health legislation that are being introduced into Congress and the state legislatures are largely stimulated by this increasing consumer demand. The Health Conference in Washington in July 1938—at which the demonstration of the great need of improvement in medical care went unchallenged by organized and unorganized medicine,—made this demand much more audible. Physicians should neither underestimate the potential power of this demand nor fail to meet it with open minds, admitting that a genuine need exists and demonstrating their eagerness to satisfy it. I think that the recently published platform of the American Medical Association should help greatly in this respect.

Medicine is in the limelight. Physicians should court such illumination. If there are blemishes that need removal or portions of the structure that need alteration, physicians should be the first to suggest such changes because they are the experts who should plan them.

I wonder if this consumer demand can be met better by training a great chorus to sing "See how efficient we are! listen to what we have done!" than by admitting frankly the gaps in adequate medical care which for years have been known to exist,—and which the public has recently discovered,—and by demonstrating a readiness to at

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tempt to close them. With a knowledge based on experience, and vastly more profound than the public can ever acquire, one should be able to overcome the effect of any false or evil-minded propaganda. One may even persuade well-meaning but less well-informed sociologists that physicians also have good intentions and are busying themselves about plans devised to achieve the ends that both doctors and welfare workers desire. Medicine, like the accused man at the bar, is surely entitled to be considered innocent until proved guilty, and so also are many of those who are proposing plans for the improvement of medical care. One should do well to remember the words of Sir Thomas Browne in his *Religio Medici*, "In all disputes so much as there is of passion, so much there is of nothing to the purpose, for then reason like a bad hound spends upon a false scent." If informed and fair-minded representatives of medical practice should sit around a council table with economists and sociologists and public-health officials, I believe that it would be both more dignified and more likely to realize the ends all physicians are seeking than it is to fight propaganda by propaganda and to throw down the gage of battle. It would certainly be less confusing and probably more profitable to the patients, who are the real consumers of medical care. Now that Dr. Goebbels has converted propaganda into a brutal science by sacrificing truth on the altar of expediency, I mistrust propaganda more than ever. I hope that medicine as well as this country may be kept out of war.

DEFINITION OF THE ISSUE

To define the issue one must start with a premise that is a definition of medicine's goal, the star to which the medical wagon must be hitched. Sir Arthur Newsholme,⁵ in *Medicine and the State*, sets the goal in the following thoughtful sentence, "In the first place, the health of every individual is a social concern and responsibility, and secondly, as following from this, medical care, in its widest sense, for every individual is an essential condition of maximum efficiency and happiness in a civilized community." In 1930, the British Medical Association⁶ also asked a question and answered it: "What kind of health service should be at the disposal of every member of the community? The answer is simple. Every kind of service which may be necessary for the prevention and cure of disease and for the promotion of full mental and physical efficiency." Dr. West's statement of what he considered to be the outstanding problem of medicine, to which I have referred, implies that in the solution of the problem the attainment of this same goal is sought.

The premise would seem to be that health is not a commodity and that every citizen and his or

her dependents have no more inalienable a right to "life, liberty and the pursuit of happiness" than to the protection, the maintenance and the improvement of their health by every means known to medicine, economics and sociology. One may take pride if one will in the fact that medicine in the United States has led the world in accomplishment and speed of development, nevertheless, this in no way frees physicians from eagerly striving to find the solution of Dr. West's problem, which has not yet been found.

It may help to clarify the issue if one recognizes the extent to which governments—local, state and federal—are already participating in medical care. Prophylaxis and treatment are no longer separated departments of medicine. They are inextricably bound together. In the British Medical Association proposals⁶ for a general medical service, published in April, 1930, under "Services Required," the first fundamental principle stressed is "that a satisfactory system of medical service must be directed to the prevention of disease no less than to the relief of individual sufferers." Under the caption of "For Treatment of Disease" appears this significant and I believe very sound statement, "In so far, however, as the individual doctor can promote the prevention of disease, this can be secured by associating every general practitioner with the general health service and emphasizing on every possible occasion the fact that there is no real line of demarcation between the preventive and curative branches of professional work." The proposals then point out the extremely important place that the family physician has always occupied and must continue to occupy in any satisfactory system of medical service.

The increasing dependence of practicing physicians on governmentally supported laboratories in this country is shown by the report⁷ of the Bureau of Social Hygiene of the Department of Public Health of the City of New York. The diagnostic services of this bureau are available to practicing physicians for the examination of their patients, for diagnostic and laboratory service and for consultation concerning diagnosis or treatment. Reports are made directly to physicians. The surprising increase in service rendered to physicians and the increasing use of the service made by them is shown, for example, in the examinations for syphilis. In 1934 there were 3411 examinations, in 1937 there were 5747 and in 1938 there were 8791, the latter is an increase of more than 3000 examinations in one year. There were over 29,000 more smears for gonorrhea and over 37,000 more blood examinations in 1938 than in 1937. The treatment services of this bureau are also being utilized by physicians to a larger and larger extent. These clinics are maintained for those unable to pay for either private care or voluntary

hospital care. Persons able to pay are referred to private physicians. In the four years 1934 to 1938 there was an increase in the total number of visits of over 370,000, and in the single year ending January 1, 1939, an increase of over 100,000.

According to the Report of the Committee on the Costs of Medical Care, there were in 1930 almost twice as many hospital beds in the United States supported by governments as by nongovernmental agencies. Private medicine, even helped by philanthropy, can no longer support our hospitals for mentally deranged patients. Many years ago there was much opposition from organized medicine to governmentally supported sanatoriums for tuberculosis. Few of us would oppose such support today. A consumer demand induced the Massachusetts legislature ten years ago to legislate the establishment of a special hospital for the investigation and treatment of cancer in the face of determined opposition from the State Department of Public Health and the medical profession. Recently the doctors—not the citizens—of the western part of Massachusetts have requested that another hospital for the same purpose be established in their community. The term "socialized medicine" is unpleasant to all physicians, but co-operation between local, state and federal governments and general practitioners surely represents a form of social service beneficial to both physicians and their patients.

ATTITUDE TOWARD PROPOSED LEGISLATION

I am still speaking only as an individual, but I am also utilizing material already assembled and printed by the Committee of Physicians for the Improvement of Medical Care, of which I am a member. Most of this material is taken from a printed statement issued by the committee and dated August 15, 1939, under the heading, "Proposals for Amendment of the Wagner Bill (S 1620)". In the bill as introduced by Senator Wagner its purposes are set forth in the following words, "To provide for the general welfare by enabling the states [I repeat, the states] to make more adequate provision for public health, prevention and control of disease, maternal and child health services, construction and maintenance of needed [I repeat, needed] hospital and health centers, care of the sick, disability insurance and training of personnel, to amend the Social Security Act, and for other purposes." There might possibly be some objection to amending the Social Security Act, and one must scrutinize the unnamed "other purposes" for which the bill has been drawn. Nevertheless, I think all physicians will agree that the main purposes as stated are

worthy and noncontroversial. The bill has received the general support of consumer groups—labor, farm and women's organizations and so forth—and has been subjected to both favorable and unfavorable criticism by various professional groups. The subcommittee of the Senate Committee on Education and Labor before which the hearings were held gave the impression of receptive open-mindedness and intelligent interest. The only hearing that I attended was conducted with dignity and complete fairness. I quote from the published report⁴ of this subcommittee at the conclusion of the preliminary hearings:

Federal legislation along the general lines followed by S 1620 based upon federal-state co-operative programs, is necessary to strengthen the health services of the nation and to make provision for the progressive and effective improvement of health conditions in all parts of the country and among all groups of people.

The role of the Federal Government should be primarily to give technical and financial aid to the states. The committee will continue to study S 1620 so that a definite report on the proposed legislation can be submitted soon after the beginning of the next session of Congress.

It would appear, therefore, that more of the matter will be forthcoming.

The Committee of Physicians for the Improvement of Medical Care has expressed its sympathy with the general purpose of the Wagner bill, and agrees with the American Medical Association that a functional co-ordination of all federal and medical activities is almost a necessity (Platform, American Medical Association, Statement No 1), that there should be an allotment of such funds as Congress may make available to any state in actual need for the prevention of disease, the promotion of health and the care of the sick, on proof of such need (Platform, American Medical Association, Statement No 2), and that there should be an extension of medical care for the indigent and medically indigent (Platform, American Medical Association, Statement No 5).

There would seem to be a fairly general medical consensus that if adequate medical care is to be made available to the people of this country, governments—local, state and federal—must assist in providing it, as indeed these governments are already doing. Experience has seemed to show that federal participation may best be effected by grants-in aid to the states on the basis of demonstrated need and of approved programs initiated by the states, administered by the states and, insofar as is possible, supported by the states.

The Wagner bill calls for large appropriations of federal funds. The national debt is increasing

and the budget is not yet balanced. As the Committee of Physicians⁸ has said

The provision of monies by the Federal Government to assist in medical care at once involves the government in the setting up of suitable machinery to see that the monies so appropriated are expended in such a way as not only to improve the medical care offered to the people but to maintain and improve the standards of the institutions and individuals participating in this care. Only by insistence upon this principle can the prudent use of public monies be guaranteed. Although provisions for this purpose are included in every title of the Wagner bill, there are certain features in these titles and in the bill as a whole that militate against the achievement of these objectives

The first of these is that divided control in the planning and execution of the program is incompatible with any sound program for national health, in other words there should be unified federal health authority. As a corollary to this there should be a federal general health council and local general health councils in the several states. The establishment of a unified federal health authority and of a general health council should be the first steps taken in connection with the institution of a national health program. Although special measures, such as those contained in Title V (Maternal and Child Health), Title VI (Public Health) and Title XII (Hospitals and Health Centers) of the Wagner bill may be expedient, the main objective should be to provide in every community a unified program of health service and medical care which will meet the standards approved by the health council that has been proposed. The committee believes that the lack of provision—in the bill as it now stands—for support of medical education and research may cut the ground from under good medical practice.⁸ The achievement and maintenance of the highest standards of medical education are the very foundation stones of high-quality medical practice. The committee considers this to be one of the most serious of the defects in the bill S 1620.⁹

In the draft of the Committee of Physicians to which I have referred there follow specific proposals including details concerning the method of appointment of the general federal health council and the character of its membership. It is stated "that representation of special interests should be subordinated to the more important point of assembling outstanding persons with imagination, intelligence, critical judgment and expert knowledge in public health and medicine, a majority of whom should hold degrees of Doctor of Medicine."⁸ The term of office should be sufficiently long to permit members of the council to look on membership in it as a career. These members should give full time to their duties, and remuneration

should be sufficient to attract persons of the highest quality. One will see that in such a set up an entirely experimental approach would be made to the federal treasury, and no appropriations would be asked for or made until need had been demonstrated and a program for meeting this need had been approved by the general health council. No grants-in-aid to the states would be made unless their programs and their estimated costs were approved by the general health council.

At the present moment only a very bold group of planners would feel itself able to state exactly how the health needs either of the different states or of the nation as a whole can best be met. It would be a still bolder group that in advance would be sure of being able to make any reliable estimate of the cost of meeting these needs, which is what the Wagner bill attempts to do. A system or various systems of improving medical care in the United States should be worked out in an evolutionary manner. The method of trial and error will often be necessary in order to enable one to determine the success or failure of any proposed system. However, physicians must do something about it, for undoubted need exists, and the consumer demand will be likely to become impatient if they delay in repeated attempts to make available all that medicine knows to larger and larger groups of citizens and their dependents. It is interesting to recall that in both the majority and minority reports of the Committee on the Costs of Medical Care,¹⁰ made seven years ago under the heading of "Co-ordination and Control of Medical Service," the importance of putting these measures into effect in the "immediate future" was stressed.

In closing I wish to say that I am in entire accord with the statement made by Dr Van Etten,¹¹ president-elect of the American Medical Association, in his Canandaigua speech of September 28, 1939, "It seems inevitable that the insurance principle shall be involved in plans for medical service, and it seems wise that many trials be made in the various states, such as are now proceeding in California and New Jersey, before national health plans shall be promoted." I subscribe to the belief, which I think is rather generally held, that no nationwide system of compulsory health insurance should be imposed, and that the non-profit voluntary systems which are spreading so fast should be given a fair and sympathetic trial.

Later in this same speech Dr Van Etten said

I believe that our people would be responsive to an American health program if the physicians of the country could be inspired to write it. I believe that it should strongly preserve the quality [I repeat, the

quality] of medical care, competently distributed. I believe that the units of health administration should be the states, and their political subdivisions where local needs are known. The general practitioner should be supported in his relationship to the American family

It seems hardly necessary for me to say that I am in accord with these statements also

The Committee of Physicians* has stated

To effect a real improvement in medical care, not only the distribution of medical care but also the quality of medical care must be continually improved. The intellectual equipment and technical proficiency required to understand and apply the new weapons that science has given us to combat disease have grown rapidly. The educational background that was adequate a decade ago is quite insufficient today. Knowledge becomes obsolete as rapidly as apparatus. Greater opportunity must be given not only for the initial training of physicians but for their continuous education. In fact the practicable level of quality in our medical services will ultimately depend upon our educational system. Investigations must also be fostered in order that our means for combating sickness and disability may be enhanced.

Society cannot afford to refuse financial support for measures that will curtail or eliminate disability. If it does refuse, it will be required to furnish larger sums for the continuing support of the results of this disability.

I have gained the impression that the interested lay public has been disturbed by what it thinks has been an inflexible attitude of certain medical and lay groups toward methods proposed for the improvement of medical care—an attitude which

the public interprets as standpoint. I am not one of those who believe that the individual physician has lost caste with the lay public or is in danger of losing caste. On the contrary, there seems to be evidence that the practicing physician is today treating his patients with more rather than less skill, and with as clear a conscience and as sympathetic an attitude as he ever exhibited in the horse-and-buggy age. As Sir Arthur Keith¹² once wrote concerning another medical advance, "Goodness knows we are a long way from finality." I fancy that physicians will still be a long way from finality for generations to come, for the star to which I have suggested the medical wagon should be hitched may be light years away 372 Marlborough Street.

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PROGNOSTIC FACTORS IN CARCINOMA OF THE BREAST*

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BOSTON

IT IS a matter of common experience that a considerable number of cases of carcinoma of the breast, operable by the usual criteria and subjected to radical mastectomy, develop early recurrence of the disease, which runs a rapidly fatal course. In an effort to discover factors common to these cases and possibly of prognostic value, we have studied a group of 30 patients all of whom had received radical mastectomy, with subsequent rapid recurrence and death within eighteen months. For comparison, two other similarly treated groups were studied. One of these consisted of 48 patients who had died of recurrence after eighteen months, while the other was made up of 47 patients living and well five or more years after the radical mastectomy. These three groups will be designated throughout the discussion as "early deaths," "late deaths" and "cured cases." We are well aware of the fallacy of attempting to draw accurate statistical conclusions from groups of such small size. Many of the data are presented with the realization that nothing but gross impressions can be formed and only striking differences can be brought out. All cases in which radical operation was car-

aged forty-one, forty-five and fifty-nine, were all considerably better than the group average as regards operative risk. In the remainder of the group it will be seen that the typically bad risk patient was obese, old and hypertensive. Such an observation is in no way startling or unexpected, but cannot help but impress the surgeon with the danger of radical mastectomy for a patient of this type, particularly in view of the added technical difficulty that the obesity entails. In 6 cases the cause of death was pulmonary disease—4 patients dying from bronchopneumonia, and 1 each from massive pulmonary collapse and pulmonary embolus. In the remaining 6 cases the cause of death was sepsis originating in the operative wound, with subsequent systemic manifestations. In 4 of these, positive blood cultures were obtained, the streptococcus being the organism in each, and in 2 (Cases 6 and 11) infection developed after a Thiersch graft following an uneventful convalescence from mastectomy. In Case 6 intensive pre-operative radiation, as well as concomitant diabetes, without doubt contributed largely to the rapid septic course.

TABLE 1 Total Deaths in Patients Subjected to Radical Mastectomy

| TYPE OF DEATH | NO. OF DEATHS |
|-------------------------------------|---------------|
| Postoperative deaths | 12 |
| Deaths from recurrence within 18 mo | 30 |
| Deaths from recurrence after 18 mo | 48 |
| Deaths from intercurrent disease | 8 |
| Total | 98 |

ried out and in which death occurred later are listed in Table 1.

POSTOPERATIVE MORTALITY

A total of 319 radical mastectomies have been performed at the Pondville Hospital, with 12 postoperative deaths, a mortality rate of 3.8 per cent. Careful scrutiny of these cases brings to light several factors of importance (Table 2). Three patients (Cases 10, 11 and 12) succumbed to sepsis within a single month during a period when there were a considerable number of cases of streptococcal sore throat in the hospital. These patients,

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AGE INCIDENCE

The average age was 50.3 years in the early death group, 51.2 years in the late-death group and 51.1 years in the cured group. Sixty-five per cent of the patients in the early-death group had passed the menopause, 60 per cent in the late-death group and 57 per cent in the cured group. Naturally no significance can be attached to these figures. The data on the menstrual status are further complicated by the practice of carrying out prophylactic artificial menopause in a number of the young patients after radical mastectomy. One of us (G. W. T. §) suggested elsewhere that this procedure is of doubtful value. It is interesting to note, however, that the present study lends no support to the belief that mammary carcinoma is more malignant in younger than in older women.

Analysis of the groups in regard to fertility status and lactation was inconclusive, although there appeared to be a slight tendency for the cured patients to be less fertile than those in the other two groups.

§Taylor, G. W. Evaluation of ovarian sterilization for breast cancer. *Surg., Gynec. & Obst.* 68:452-456, 1939.

DURATION OF DISEASE

It was natural to expect that the preoperative duration of disease in the patients cured for five years or more would be shorter than that in those who did badly following operation, the figures bear out this assumption. The average preoperative dura-

SKIN INVOLVEMENT

Although the classic description of carcinoma of the breast includes skin retraction and puckering, it is commonly recognized that this condition represents a later stage of the disease. Analysis of our cases in regard to the frequency and char-

TABLE 2. *Postoperative Deaths*

| CASE No. | HOSPITAL No. | AGE | WEIGHT | BLOOD PRESSURE | ANESTHETIC | POSTOPERATIVE TIME OF DEATH | CAUSE OF DEATH |
|----------|--------------|-----|--------|----------------|---------------------------------|-----------------------------|--------------------|
| | | yr | lb | mm | | | |
| 1 | 1543 | 74 | Thin | 230/100 | Ether | 6 days | Pneumonia |
| 2 | 1748 | 75 | Obese | 220/90 | Novocain | 1 day | Pneumonia |
| 3 | 2522 | 69 | 162 | 185/100 | Ether | 9 days | Pneumonia |
| 4 | 4280 | 55 | Obese | 180/100 | Nitrous oxide, oxygen and ether | 3 days | Sepsis |
| 5 | 5103 | 70 | 120 | 180/116 | Avertin | 2 days | Pneumonia |
| 6 | 4766 | 63 | 166 | 230/110 | Novocain | 8 weeks | Sepsis |
| 7 | 7916 | 76 | 173 | 200/100 | Nitrous oxide, oxygen and ether | 2 days | Pulmonary collapse |
| 8 | 10832 | 61 | 175 | 200/120 | Ether | 11 days | Embolus |
| 9 | 11928 | 56 | 124 | 160/100 | Nitrous oxide, oxygen and ether | 15 days | Sepsis |
| 10 | 8692 | 41 | 107 | 110/74 | Nitrous oxide, oxygen and ether | 5 days | Sepsis |
| 11 | 9105 | 59 | 150 | 180/84 | Nitrous oxide, oxygen and ether | 37 days | Sepsis |
| 12 | 2170 | 45 | 153 | 140/76 | Nitrous oxide, oxygen and ether | 9 days | Sepsis |

tion in the cured cases was 7.7 months, as contrasted with 12.0 months for the patients who subsequently died. Sixty-three per cent of the cured patients were first seen within six months of onset, and 84 per cent were seen within one year. The corresponding figures for the fatal cases were 54 and 71 per cent.

SIZE AND LOCATION OF LOCAL LESION

The lesions were classified in three groups, small, up to 2 cm in diameter, medium, 2 to 4 cm, and large, over 4 cm (Table 3). It may be seen that

TABLE 3. *Size of Lesion in Relation to Outcome*

| SIZE OF LESION | EARLY-DEATH GROUP | LATE-DEATH GROUP | CURED GROUP |
|----------------|-------------------|------------------|-------------|
| | % | % | % |
| Small | 0 | 14 | 44 |
| Medium | 21 | 33 | 42 |
| Large | 79 | 53 | 14 |

the early-death group showed a great preponderance of large sized lesions. It is equally impressive that 86 per cent of the cured cases presented lesions less than 4 cm. in diameter. These figures show very strikingly the relation between the size of the lesion and its curability.

Careful analysis was made of the location of the lesion in the breast in relation to its curability. No findings of any significance resulted from this study, possibly because the groups were small. Growths in the upper outer quadrant predominated in all three groups of cases, perhaps excessively in the groups with subsequent fatal outcome.

acter of skin involvement is shown in Table 4. In the early-death group in no case was the skin not involved, while in nearly half the cases (43 per

TABLE 4. *Skin Involvement in Relation to Outcome*

| TYPE OF INVOLVEMENT | EARLY DEATH GROUP | LATE DEATH GROUP | CURED GROUP |
|---------------------------------|-------------------|------------------|-------------|
| | % | % | % |
| No involvement | 0 | 20 | 61 |
| Dimpling alone | 0 | 61 | 32 |
| Dimpling plus edema | 7 | 5 | 5 |
| Dimpling plus edema and redness | 11 | 5 | 0 |
| Ulceration | 14 | 10 | 2 |
| Paget's disease | 11 | 0 | 0 |

cent) the involvement was more extensive than dimpling alone. Among the patients dying of recurrence after eighteen months, 20 per cent presented no evidence of skin involvement, and only 20 per cent showed more involvement than simple dimpling. In the cured group there was no evidence of skin involvement in about a third of the cases, and only 3 patients (7 per cent) presented involvement more grave than dimpling.

It is evident that dimpling in itself does not increase the gravity of the prognosis. However, when edema, redness or ulceration is superadded, the likelihood of cure is markedly diminished.

INFLAMMATORY CARCINOMA

There were 8 cases of so-called "inflammatory carcinoma." Five of these were in the early-death group and 3 in the late-death group. Five patients had received intensive preoperative radiation, of whom 4 died early and 1 died late. In the cured group there were no cases of inflammatory carcinoma and no patients had had intensive preoperative radiation. Attention may be drawn to those

cases in which preoperative radiation was employed. These were all considered locally inoperable by the usual criteria when first seen. Subsequently, with good regression of the tumor and negative x-ray studies as regards distant metastases, they were considered to be operable. The consistently bad outcome convinces us that an inoperable lesion cannot be made operable by radiation, despite marked regression.

SECONDARY RADICAL MASTECTOMY

Eight patients were submitted to radical mastectomy after previous inadequate surgery performed elsewhere. Five of these presented frank recurrence at the time of their secondary operation, 1 died early, the other 4 late. The 3 patients who were cured by secondary radical operation showed no evidence of residual disease in the specimen removed at operation. These findings suggest that a secondary radical operation for frank recurrence is not likely to be successful.

AXILLARY INVOLVEMENT

The influence of axillary involvement on the prognosis in carcinoma of the breast has been repeatedly observed and emphasized in end-result studies in large series of cases. Our present study confirms the findings of others. Axillary nodes were involved pathologically in 90 per cent of the patients who died within eighteen months, in 72 per cent of those who succumbed to later recurrence and in only 32 per cent of those who were cured. We were again interested in the question of the accuracy of clinical appraisal of axillary-node involvement. In a total of 265 axillary examinations, the clinical appraisal was confirmed by the pathologist in 191 cases, and failed

to be confirmed in 74 cases (28 per cent), as shown in Table 5. Errors of appraisal were fairly equally distributed between the two possibilities of considering an innocent axilla as involved and of failure to detect the presence of metastatic in-

TABLE 5 *Comparison of Clinical Axillary Examinations with Pathological Examinations*

| STATUS | No. of Cases |
|--|--------------|
| Positive clinically and pathologically | 94 |
| Negative clinically and pathologically | 97 |
| Negative clinically, positive pathologically | 44 |
| Positive clinically, negative pathologically | 30 |
| Total | 265 |

volvement. These figures again emphasize the danger of giving too much weight to the clinical estimate of axillary involvement in planning appropriate treatment.

CONCLUSIONS

On the basis of this study, the prognostic importance of the clinical characteristics of carcinoma of the breast, as it is presented for treatment, is apparent. Large lesions and those with skin involvement or extensive axillary involvement offer a poor prognosis, in many cases so poor as to contraindicate surgical intervention even in the absence of remote metastasis. The operative risk must be given careful consideration. Old age, obesity and hypertension seem to increase the hazard. While it is still impossible to prognosticate accurately in any single borderline case we believe that the chance of cure should be carefully weighed against the operative risk and the normal life expectancy. Palliative measures may well be indicated more often than they are now employed.

THE ANTEMORTEM RECOGNITION OF PULMONARY EMBOLISM*

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TO THE fourth year medical student the clinical diagnosis of fatal pulmonary embolism apparently presents few difficulties. A rather obese middle-aged woman's recovery from an abdominal operation has been uneventful except for a mild phlebitis. During the second week she calls for the bedpan and then, clutching her chest, utters a gasping cry and expires. That the reliability of this composite picture may be open to question is hardly suggested by McCrae's¹ description: "In the case of a large embolus blocking a main branch of the pulmonary artery death may be almost instantaneous, perhaps after a cry. In other cases there are sudden severe dyspnea, thoracic pain, distress and cyanosis, followed by unconsciousness and death." Emerson² elaborates on this by saying that the patient with rapidly fatal pulmonary embolism first experiences sudden pain or tightness in the chest: "He becomes ashen in color anxious, then cyanotic and dyspneic. Pulmonary edema develops, the pulse becomes feeble and death follows in a few minutes or hours." Homans³ stresses sharp, stabbing, pleuritic pain, with orthopnea and blood-tinged sputum. Barnes⁴ points out, as does White,⁵ that pulmonary embolism and coronary thrombosis have many clinical features in common, such as sudden onset, pallor and sweating, precordial pain, weakness, vomiting and collapse, with fall of blood pressure and rise in temperature, pulse, respirations and leukocyte count. White says: "The majority of case reports of pulmonary embolism describe the patient as being in a state of shock with feeble pulse, apprehension, sweating, pallor, dyspnea and low blood pressure. Cyanosis is frequently present and often extremely marked whereas in other patients pallor predominates. Whether or not chest pain is present depends largely on the analysis of the examiner." Unilateral rales and signs of consolidation, he adds, may be demonstrated if the patient lives long enough. The x-ray picture is seldom helpful for the first twenty-four hours, and may not be diagnostic even then. Both Barnes and White believe that the electrocardiogram furnishes valuable diagnostic evidence. Hosoi⁶ stresses the importance of these clinical features, and lists them in the following

order of frequency, after a study of 64 cases confirmed by autopsy: dyspnea, restlessness, cyanosis, sweating, vomiting, pain in the chest and cough, with or without bloody sputum. He does not give the frequency distribution of these symptoms, however, nor does he state how many of them we may expect to find in one and the same patient.

This unanimity of opinion as to the diagnostic criteria for pulmonary embolism should render an accurate diagnosis a simple matter, even for the tyro. And if all the criteria are present, it is. But a study of 43 fatal cases in which autopsy showed pulmonary embolism to have been the immediate cause of death reveals that only 3 cases answered the composite description quoted by White. In 9 cases the clinical picture ante mortem was so atypical as to make the diagnosis of pulmonary embolism unwarranted, even in retrospect. Furthermore, during this study I encountered a significant number of patients who presented a sufficient number of these criteria ante mortem to warrant a diagnosis of pulmonary embolism but in whom the pathologist found sepsis, without evidence of embolism, as the cause of death. Because of other lethal states which resembled pulmonary embolism clinically, and the cases of actual embolism which masqueraded as shock, coronary thrombosis or bronchopneumonia, this study was undertaken in order to reappraise the validity of accepted diagnostic criteria.

Since the material for the study came from three different institutions with widely varying autopsy rates, a statistical analysis of the incidence of pulmonary embolism is futile. Hosoi⁶ cites 1 such death per 1000 hospital population. Pilcher⁷ gives the same incidence for surgical cases. Henderson⁸ found that fatal cases of pulmonary embolism represented 6 per cent of all postoperative deaths during the period studied. It is evident, therefore, that this entity is of more than academic importance.

In Henderson's series the average age was about fifty-three years, which was ten years older than the average of 1000 consecutive adult surgical patients used as controls. The average age in the present study was sixty years, owing to the preponderance of cancer patients who fall into the higher age brackets. The patients were almost equally divided between the two sexes, there being 22 men and 21 women. Data on their state of nutrition was not obtainable. Henderson's patients

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were 13 pounds overweight, and the importance of obesity has also been stressed by Snell,⁹ although its exact significance is not clear from his report. Only 26 of the patients in my series developed fatal pulmonary embolism after an operation, but all 43 were suffering from some sort of surgical lesion. The type of anesthetic was probably not significant, in view of the relative frequency of the various types of anesthetic used in all surgical cases. Fourteen patients had a general anesthetic, 6 local anesthetic, 3 spinal anesthetic and 2 a combination of two or more anesthetic agents. The seriousness of postoperative infection in predisposing the patient to pulmonary embolism has been stressed by many investigators. Henderson found it in 44 per cent of his fatal cases. Robertson¹⁰ in an analysis of 146 fatal cases found phlebitis in only 4 per cent. In my study, 17 of 43 fatal cases had shown some sort of complication, usually sepsis or phlebitis, prior to the development of pulmonary embolism. Of the 26 patients who had undergone operation, 13 had had some sort of postoperative complication. That is, of the 17 cases with complications, 13 occurred in the operated group and only 4 in the unoperated. Four of the 26 operated patients had a postoperative phlebitis which was recognized ante mortem. But only 1 of the 17 unoperated patients had a demonstrable phlebitis, and this case was subjected to surgery, if a blood transfusion can be so classified.

The interval between operation and death varied from a few minutes to thirty-six days, with an average of ten days. Ten of the 26 operative deaths occurred during the first postoperative week, 8 during the second and 5 during the third. Thus far the results of this study appear to reflect the commonly accepted views which form the basis of my hypothetical medical student's easy assurance. The catastrophic suddenness of fatal pulmonary embolism is more apparent than real. Robertson found that in 39 per cent of 146 fatal cases the patients gasped, fainted, became pallid and died within one hour, whereas in 61 per cent they developed chest pain, cyanosis and hemoptysis, and lived several hours or days. Hosoi⁶ states that in 20 per cent of 64 fatal cases the patients died suddenly, while in 60 per cent they lived one to three days after operation. Unfortunately, the actual interval between the onset of symptoms and death is not made clear. In my series 13 patients died within one hour of the onset of symptoms. The remaining 30 lived from several hours to several days.

Dyspnea — labored as contrasted with merely rapid respiration — was the commonest finding,

but it occurred in only 28 of the 43 cases. In 1 aged patient it was the only clue and suggested congestive heart failure rather than embolism. Twenty-seven patients had an elevated pulse, and 23 elevated respirations. Cyanosis was present in 22 cases and was the only sign or symptom in 2. Marked weakness or actual collapse was observed in 17 cases, and in 6 it was the only evidence on which a diagnosis could have been made. Almost as frequent was sweating, which occurred in 16 cases. Fever was present in 16 cases, but 10 of these patients had pre-existing sepsis, which was probably responsible. Thirteen complained of chest pain, only 1 described this as a smothering sensation, whereas the rest referred to it as definite pain. Seven vomited, usually dark-brown material, with the onset of symptoms. This episode was clearly distinct from any postanesthetic or other postoperative complication, and occurred in patients who had been entirely free of gastric symptoms. Restlessness was frequently noted, but it was less common than in Hosoi's⁶ series. A fall of blood pressure was noted in only 5 patients, but in 1 case it actually rose to 240 mm, systolic. Unfortunately, the catastrophic nature of most of these mishaps precluded blood pressure determinations or adequate examination of the chest, so that these figures are not significant. Cough and sputum were infrequent and were not always associated in the same case. Pallor was observed in only 2 cases, in contrast to cyanosis, which occurred in 22. X-ray photographs were taken in only a few cases and failed to reveal pulmonary lesions. No electrocardiograms were taken. One Cassandra-like observation was recorded in many of the progress notes and may be significant before any definite symptoms developed: the patient frequently complained of not "feeling just right," or it was observed that he was "not doing well," or had failed to rally from the operation, patient and physician alike seemed to realize that all was not well, but the vague and amorphous character of the complaints concealed their significance. In this study, whereas 28 patients showed dyspnea, 27 tachycardia, 23 elevated respiration, 22 cyanosis and 17 marked weakness or collapse, only 11 of the 43 patients manifested all five of these criteria, and only 1 had them all plus sweating, fever, chest pain and vomiting. In 9 cases the picture was so bizarre or ambiguous that a clinical diagnosis of fatal pulmonary embolism seemed unwarranted, even in retrospect after the autopsy. The following condensed case histories are illustrative.

CASE REPORTS

CASE 1. C. McC. (3111P), a 76-year-old man with carcinoma of the face, had received both x-ray and radium

treatment. He grew steadily weaker and lapsed into coma and died within an hour without significant change in temperature, pulse or respirations. At autopsy several large branches of the pulmonary artery were found to be occluded by a recent clot.

CASE 2. C. T. (267P) a 26-year-old man with carcinoma of the parotid had had radium seeds implanted in the growth. A few days before death he developed erysipelas and began to go steadily downhill in spite of serum. He died apparently of sepsis without any striking abnormality of temperature, pulse or respirations. Autopsy revealed a clot in the left pulmonary artery.

CASE 3. A. B. (14951P) a 70-year-old woman with carcinoma of the cecum, had a colectomy under local anesthesia. She failed to rally from the operation, became stuporous and seemed to go into shock in spite of transfusion immediately after operation. Eighteen hours after operation the blood pressure had risen to 260/58 compared with a preoperative level of 160/70 but she continued to go downhill and did not regain consciousness. Just before death which occurred 24 hours after operation there was slight cyanosis and coughing. The temperature, pulse and respirations were slightly elevated just before death but not during the preceding period of unconsciousness. Autopsy revealed bilateral thrombosis of the pulmonary artery.

CASE 4. M. E. (9973P), a 73-year-old man with inoperable carcinoma of the stomach, was apparently making an uneventful recovery from exploratory laparotomy. On the 4th postoperative day he collapsed without premonitory signs or symptoms and died within a few minutes. At autopsy emboli were found in both pulmonary arteries.

CASE 5. S. H. (5705P), a 79-year-old man, had received x-ray and radium treatment for carcinoma of the tonsils. He became markedly cachectic and dehydrated and died apparently from cachexia without change in temperature, pulse or respirations. Pulmonary embolism of the right lower lobe was found at autopsy.

CASE 6. J. C. (8654P) a 55-year-old man, had carcinoma of the rectum. Four days after posterior excision second stage, the posterior pack was removed because of sepsis. He continued to go downhill with signs of extensive sepsis and renal insufficiency. He died on the 26th postoperative day apparently of sepsis and renal insufficiency having shown marked elevation of temperature, pulse and respirations for the previous 6 days. Autopsy revealed a thrombus in the left pulmonary artery and multiple emboli in the branches leading to the right lung.

CASE 7. G. D. (7750P) a 70-year-old man, had inoperable carcinoma of the stomach. On admission for terminal care, cyanosis of the right hand was observed. On the day before death there was definite gangrene of the hand. The patient became stuporous and died quietly 2 days later with no significant signs or symptoms except a slight rise in the temperature, pulse and respirations just before death. Autopsy revealed emboli in each pulmonary artery and in the right axillary artery.

CASE 8. G. T. (7419P) a 54-year-old man had a right nephrectomy under spinal anesthesia for a hypernephroma. Three days later he became distended and the pulse rose to 130 although the temperature remained normal and the respirations did not rise until just before death. While a duodenal tube was being passed to relieve the distention the patient stopped breathing and died. Autopsy revealed

a thrombus in the branch of the pulmonary artery leading to the right upper lobe.

CASE 9. M. B. (10734P) an 81-year-old woman had been receiving palliative x-ray treatment for inoperable carcinoma of the breast. Six days after the last treatment she lapsed into coma without any premonitory signs or symptoms and died quietly a few hours later. The only positive physical findings were elevations of the pulse and respirations and incontinence, just before death. A thrombus in the branch of the pulmonary artery leading to the right lower lobe was found at autopsy.

If such clinical ambiguity exists in cases proved by autopsy one can only speculate on the validity of the 22 deaths from pulmonary embolism reported¹¹ in Massachusetts in 1935, in view of the fact that only 4 were proved by autopsy.

In Hosoi's study, 42 per cent of the postoperative emboli were found at autopsy to be in the lower lobes, more often on the right side (in the ratio of 2:1). Forty-two per cent were in the main pulmonary artery or in one or both of its branches. In my group both main branches were the ones predominately involved, but the group is too small to warrant statistical analysis.

Embolectomy has not proved a conspicuous success and the value of papaverine administered intravenously has not yet been established. Further more, before any lifesaving form of therapy can be instituted the clinical diagnosis of pulmonary embolism must be made. It is evident that in about two thirds of the fatal cases the patients survive long enough for the application of some remedial measure, provided one can be found. But an appreciation of the clinical features of pulmonary embolism is essential if one's suspicions are to be aroused to the point of securing whatever laboratory studies may eventually prove definitely diagnostic and warrant heroic measures.

CONCLUSIONS

This study emphasizes the frequency and seriousness of pulmonary embolism, and suggests that its possibility should be considered in any patient who is not doing well even though he has undergone no operation and presents no signs of infection. Dyspnea, tachycardia and cyanosis are early and frequent signs. Although often accompanied by collapse, this feature may be absent or may occur alone. Finally, there appears to be no single criterion short of autopsy by which the diagnosis of pulmonary embolism can be infallibly established or excluded. It is believed, however, that if it is remembered that this condition can mimic, and be mimicked by, coronary thrombosis, bronchopneumonia, sepsis and surgical shock, greater diagnostic acumen will be developed.

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REPORT ON MEDICAL PROGRESS

OTOLARYNGOLÔGY

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RECENT advances in otolaryngology can best be considered under the following headings ears, nose and sinuses, nasopharynx and pharynx, and larynx, trachea and bronchi

EARS

Otitis Media in Scarlet Fever

According to Wesselhoef¹ suppurative otitis media is the most important complication of scarlet fever. This conclusion is the result of his own experience with 10,000 cases of scarlet fever and a survey of the literature on this disease. The incidence of purulent otitis media in 370,000 cases of scarlet fever gleaned from the literature was 12 per cent, all the reports from various parts of the world giving approximately the same figure. This would seem to indicate that climate, which plays an important role in the morbidity of scarlet fever, exerts no influence on the incidence percentage of ear infection. The incidence of scarlet fever in the first year of life is low, but when it does occur, otitis media is frequent, although not so frequent as in the second and third years of life when almost half the patients developed otitis media. The importance of otitis media is due to its frequency and to the complications which arise from it, such as permanent deafness, mastoiditis, sinus thrombosis, septicemia, petrositis and meningitis. While infection of the middle ear may happen at any time during the course of scarlet fever, most cases occur after the first week, and particularly between the fourteenth and twenty-first days, the same period in which there is a peak for the other suppurative as well as nonsuppurative complications, such as nephritis, arthritis, endocarditis and purpura hemorrhagica. When German measles or chicken pox occurs in combination with scarlet fe-

ver the incidence of otitis media does not rise, but with measles or the common cold there is a marked increase in otitis, and with diphtheria the incidence of otitis is highest of all. While in uncomplicated diphtheria the incidence of otitis media is only 3 per cent, diphtheria that occurs during convalescence from scarlet fever raises the incidence to about 65 per cent. This is pointed out as a striking example of the enhancement in virulence of hemolytic streptococci through symbiosis. As to the effect of the removal of the tonsils and adenoids on the complicating ear infection, Wesselhoef concluded that the operation exerts no beneficial influence on the incidence of middle-ear abscess or mastoiditis. The value of tonsillectomy during the convalescence from scarlet fever was regarded as an entirely different matter. The practice of removing large and infected tonsils and adenoids after the third week is now well established as a safe procedure that often has a good influence on the course of suppurating ears and other complications. Paracentesis of the eardrum is of value to relieve pain or to provide adequate opening. But the influence of paracentesis on the course of otitis media is not so great as most textbooks indicate. In regard to the value of cod-liver oil as a preventive of middle-ear complications, Wesselhoef points to a study² done on the scarlet-fever wards of the Boston City Hospital, where large doses of cod-liver-oil concentrate were administered to 500 patients with no benefit.

Otitis Media Due to Type 3 Pneumococcus

As the infecting agent in otitis media, the Type 3 pneumococcus is one of the most treacherous organisms with which the otologist has to deal. It often acts in an insidious manner, giving rise to few symptoms while causing great destruction of bone. Ears infected by this organism are much

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more likely to be the origin of intracranial complications than are those infected by the hemolytic streptococcus. While the use of sulfanilamide and sulfapyridine has undoubtedly reduced the number of complications from middle-ear disease due to this organism, and has unquestionably cured a great many, these drugs should still be regarded as an adjunct to the treatment. The patient should be watched even more carefully than before, for the drugs frequently produce a masking effect on the course of the infection that may be confusing or misleading. An analytic study was made by Maybaum and Druss¹ of 73 patients who had middle-ear and mastoid infection due to the Type 3 pneumococcus. The disease in most of the cases ran the usual clinical course of infection of the middle ear, followed by mastoiditis or intracranial complication. Mastoidectomy was performed on 69 patients. In 46 cases there was marked impairment of hearing. These authors emphasize the point, already known, that pronounced impairment of the hearing in the presence of an apparently normal tympanic membrane, or one only slightly thickened, suggests a Type 3 pneumococcus infection. There was bemicranial pain in 44 cases. Tenderness over the mastoid was noted in 49 cases and was not present in the others, even when a subperiosteal abscess developed later. The x-ray findings in the mastoid processes were not characteristic. The average duration of symptoms before operation was thirty-three days, a longer interval than is ordinarily observed in streptococcal infections of the mastoid. In 41 cases there was extensive destruction of bone in the mastoid, and frequently marked softening without actual pus formation. In 23 cases a perineural abscess was noted, and in 9 an epidural abscess of the middle or posterior fossa was seen. Of the 73 patients studied, 59 were discharged as improved and 14 died, a mortality rate of 15 per cent. Prolonged observation of the patient after complete healing of the mastoid is regarded by these authors as of extreme importance.

Aero-otitis Media

With the development of travel by air a condition known as aero-otitis media is becoming more prevalent. This has been defined as an acute or chronic traumatic inflammation of the middle ear, caused by a pressure difference between the air in the tympanic cavity and that of the surrounding atmosphere. It commonly occurs during marked changes in altitude, and is characterized by inflammation pain tinnitus and deafness. According to Lovelace, Mayo and Boothby,⁴ failure to ventilate the middle ear voluntarily may be the result of inexperience, carelessness or failure to

awaken sleeping passengers on transport planes. The most frequent causes of inability to ventilate the middle ear are stenosis of the Eustachian tube as a result of an acute or chronic infection of the upper part of the nose and nasopharynx, paralysis of the soft palate or superior pharyngeal muscles, enlargement of the pharyngeal or tubal tonsil, in inflammatory conditions of the Eustachian tube or middle ear and scar tissue about the ostium of the Eustachian tube. In acute aero-otitis media there is first a feeling of fullness in the middle ear due to a negative or positive pressure equivalent to 3 to 5 mm of mercury. As the decrease in pressure becomes more marked the hearing becomes less acute. There are tinnitus, increasing pain and, sometimes, vertigo. Higher pressures produce agonizing pain. The tympanic membrane ruptures when it is under an air pressure equivalent to 100 to 150 mm of mercury. The symptoms are relieved by the opening of the Eustachian tube, if the negative pressure has not become so great as to render this impossible. In chronic aero-otitis media there is partial deafness, which may be more pronounced on one side and vary from day to day, with a sensation of fullness and stiffness in the ears and with head noises. This deafness is made worse by changes in altitude and by acute infections of the upper respiratory tract. On examination the eardrums are either bulging or, more frequently, retracted. The drum membrane is dull and lusterless, and sometimes slightly thickened. The light reflex is diminished or absent. The hearing is decreased, and the deafness is of the conductive type. One of the authors, who was himself subject to this type of auditory distress, sometimes for two or three days, after traveling in an airplane, administered by inhalation a mixture of 80 per cent helium and 20 per cent oxygen to several subjects, in the hope of alleviating or preventing the condition. As a result of these experiments the authors suggest inhalation of helium and oxygen as an adjunct in the prevention and treatment of acute aero-otitis media. Further measures for the alleviation of this condition, as advocated by Armstrong and Heim,⁵ consist in swallowing, yawning, singing, autoinflation of the Eustachian tube and contraction of the salpingopharyngeal muscles. The use of vasoconstrictor drugs in spray form is suggested for those with an upper respiratory infection. Acute aero-otitis can also be relieved by instillation of water at about 110°F into the external auditory canal and the application of dry heat, together with the spraying of astringents into the nasopharynx every two to four hours. Inflation of the tympanic cavity may be done where necessary.

NOSE AND SINUSES

Allergy

It is the opinion of Hansel⁶ that too much surgery of the nose, sinuses and throat is being done without considering the factor of allergy. While surgical procedures are indicated in certain cases, results will not be satisfactory unless the allergic factors are controlled. There are often other associated evidences of allergy, such as asthma, bronchitis, bronchiectasis, gastrointestinal allergy, allergic headache, urticaria, eczema and angio neurotic edema, which must also receive proper attention from the allergic standpoint. In order that the patient may get the best possible care there must be close co-operation between the otolaryngologist and the allergist. Among the possible manifestations of allergy are aphthous stomatitis and canker sores, both of which are of relatively common occurrence. Some cases of gingivitis have been claimed by dentists to be of allergic origin. Tonsillectomy rarely has a distinct beneficial effect on respiratory allergy but may reduce the incidence of complicating infections. Among 200 children considered by Hansel for removal of the tonsils and adenoids, 26 had definite respiratory allergy. If the tonsils and adenoids are large in allergic children and obstruct the air passages they should be removed, because nasal respiration is thereby impaired. The operation should not be performed during the hay-fever season.

From a review of the current literature, Hansel gives the following summary of the status of ionization in nasal allergy. Many leading rhinologists consider ionization of the nasal mucosa a safe measure in the treatment of hay fever and perennial nasal allergy. On the other hand, the observations of several prominent allergists indicate that ionization does not give results comparable to those obtained by allergic methods of treatment. Several observers have shown that the use of escharotics in nasal allergy produces results equally as satisfactory as those obtained by ionization. So far no permanent destructive changes have been noted as a result of ionization. However, complications such as anosmia, neuralgia and sinusitis have been reported in a few cases. Satisfactory relief following ionization is apparently the result of a general desensitizing effect, as well as a shrinkage of the nasal tissues and the diminution of hypersecretion. Bronchiectasis as a complication of bronchial asthma is seen not infrequently, on the other hand, chronic bronchitis and bronchiectasis occur in the absence of definite asthma. Polypoid changes in the mucous membrane of the nose and paranasal sinuses similar

to those noted in cases of allergy commonly co-exist in bronchiectasis without asthma. According to Hansel few observers have paid any particular attention to the incidence of allergy in these patients, and the changes in the nose, sinuses and bronchi have been treated as though infectious in origin. Now the question arises as to the part played by allergy in bronchiectasis with or without co-existing sinus changes. Watson and Kibler⁷ observed that bronchiectasis is seldom found without some evidence of sinusitis. They also noted that many patients with bronchiectasis had some manifestations of allergy such as hay fever, asthma, urticaria, eczema and rhinitis. On studying the cytology of the nasal secretions they were impressed by the frequency of the high percentage of eosinophils. A similar study of the sputum likewise showed an abundance of eosinophils in a large percentage of cases. On this basis these authors began investigation and treatment of these cases from the allergic standpoint and were able to obtain most satisfactory results. Thus a new conception of the etiology of bronchiectasis that makes its prevention and recovery possible has been presented. The development of the disease is explained on the following sequence of events: a basal allergic bronchitis, atelectasis and eventually, after a variable length of time, bronchiectatic dilation.

Röntgen-Ray Therapy in Sinusitis

During the last ten years there has been an increased interest in roentgen-ray therapy of sinusitis. With few exceptions the articles on this subject have been contributed by radiologists. A review of the literature by Gatewood⁸ revealed an absence from the case reports of any uniform rhinologic study and a wide variety of roentgen-ray techniques, some authors favoring large infrequent doses and others preferring light doses scattered over a long period. It is generally agreed that x-ray therapy is most effective with certain types of hyperplastic sinus membrane. The best results are obtained in a subacute or recent sinusitis where there is marked infiltration, with little air space. Gatewood observed 22 cases before and after radiologic treatment. Four patients showed complete relief of symptoms, the clinical findings were entirely normal and the diagnostic films clear. These patients were considered, in a sense, well. Eight patients were symptomatically improved, but irrigations of the antrum of 3 showed purulent discharge. Ten patients thought that they were not helped symptomatically. Their x-ray films did not show any appreciable change from the originals, and clinical examination showed little or no difference from

the appearance before x ray treatment. Four of these 10 patients were operated on by means of the double Caldwell Luc operation. In each case the antrums were filled with hyperplastic mucous membrane and polypoid granulations. Cultures showed streptococci. The antral contents did not differ in appearance from those of others with this type of infection who had not been subjected to irradiation, with one exception, the same held true for microscopic examination. Gatewood believes that roentgen ray therapy for any form of sinusitis is in an early experimental stage, and that closer co-operation between the radiologist, the rhinologist and the microscopist must be obtained before the true effects of this type of therapy can be determined.

NASOPHARYNX AND PHARYNX

Thornwaldt's Bursa

Eagle⁸ reports 64 cases of nasopharyngeal bursa observed by him during the past six years. The persistent sac lies beneath the adenoids and empties by a short duct at the lower portion of this tissue. The sac extends upward and backward into the periosteum. It is apparently a persistent embryologic structure that lies dormant until traumatized or infected. In the majority of the cases symptoms due to the presence of the bursa were noted after the adenoids had been removed. Two forms of this disease are described: the cyst type (46 cases), in which the duct is occluded, and the crust type (18 cases), in which the duct is patent and the discharge is adequate but dries and forms crusts in the nasopharynx over the opening of the duct. The content of these cysts is invariably a jelly like clear or turbid substance. The symptoms in both types of the disease are practically the same: frequent upper-respiratory infections, postnasal discharge, a rather thick and tenacious material being most commonly described, headache, which is usually low occipital in type and daily or rather frequent in occurrence, and, in several cases, slight fever, especially following any attempt at local treatment of the region. Some patients with crust formation complained of a dull ache located in the nasopharynx. Obstruction of the Eustachian tube and referred pain to the ear were commonly noted. The crust type of pharyngeal bursa did not always present evidence of disease on examination, especially if the crust had recently loosened and fallen into the pharynx. A careful search may have to be made in order to find the pin-point duct orifice. The crusts were invariably conical in shape and faceted into the conical depression at the duct orifice, which is located at the lower border of the adenoid area. Cultures were made

in all operative and practically all nonoperative cases. A hemolytic *Staphylococcus aureus* was found in 19 patients, and a beta hemolytic streptococcus in 6. Mixed infections were common. Clinical diagnosis was made in all cases by examination with the nasopharyngoscope. Treatment consisted of complete removal of the sac by a thorough curetting of the entire adenoid area. This procedure necessitates much more force than is ordinarily used during an adenoidectomy. The Barnhill adenoid curet was found to be the most useful instrument for this operation. Twenty-five patients who were thoroughly curetted recovered completely from local nasopharyngeal symptoms.

Bulbar Poliomyelitis and Tonsillectomy

It has been pointed out that the incidence of bulbar poliomyelitis in children who have been recently tonsillectomized is much higher than that in any other group. Sabin¹⁰ presents conclusive experimental evidence that while mere transitory contact of the virus with the normal or injured pharynx or tonsils will not produce poliomyelitis, it is possible to infect monkeys when the virus in quantities of from one hundred to one thousand minimal cerebral infective doses is injected into the region of the tonsil. This area is for some reason more sensitive than is the abdominal, cutaneous or subcutaneous tissue. That the pathway of the virus is along a local peripheral nerve after tonsillopharyngeal injection is indicated by the high incidence of the bulbar type of the disease among these monkeys and evidence that the virus did not invade the central nervous system along the olfactory pathway. If the virus in the human being behaved as it does in a monkey—and there is no evidence that such is the case—one would expect that for the development of post-tonsillectomy poliomyelitis the virus would have to be present in the secretions or in the tonsils during the operation, and that infection would be facilitated by injection or postoperative suturing. That poliomyelitis virus does occur in the secretion of the upper respiratory tract and in the tonsils of apparently healthy human beings is already known although it is not clear whether the virus is more prevalent during the summer and early autumn than at other times of the year. These findings suggest that the season of high incidence of poliomyelitis is not a favorable period for operation on the upper air passages.

LARYNX, TRACHEA AND BRONCHI

Injury to the Larynx from a Duodenal Tube

The soft-rubber duodenal tube has come to have wide use in surgery and medicine as a siphon

for the treatment of postoperative gastric and intestinal distention and as a means of feeding patients who are unable or unwilling to swallow. The tube is commonly passed through the inferior nasal meatus to the pharynx and esophagus, and thus to the lower gastrointestinal tract. At the upper end of the esophagus the cricopharyngeus muscle, which has a sphincter-like action, grasps the tube and holds it in contact with the posterior surface of the cricoid cartilage and the posterior surfaces of the arytenoid cartilages. Even with the tube in place the patient makes some involuntary swallowing movements, and these serve to bring in even closer contact the tube and the posterior cartilaginous portions of the larynx. Considering the widespread use of the duodenal tube, accidents and untoward happenings are relatively uncommon. However, a note of warning is sounded by Iglauer and Molt,¹¹ who report 10 cases of severe injury to the larynx observed by them during a period of two years. Each of these patients had an indwelling tube in place for at least six days. Symptoms of laryngeal obstruction were so severe in 8 cases that a tracheotomy was necessary. Two of the 10 patients died. One had the tube down for only six days when she gradually developed signs of laryngeal obstruction. Postmortem examination of the larynx showed an acute ulceration through the entire thickness of the esophageal wall, with extension of the inflammation along the soft tissue about the cricoid cartilage and with involvement of the left arytenoid cartilage. Necropsy on the other patient showed, in addition to a severe laryngitis, three shallow ulcerations on the anterior wall of the esophagus in the region of the cricoid cartilage. In most of the 10 patients, evidence of injury to the larynx was first noted after permanent removal of the tube. The early symptoms included pain, dysphagia, blood-streaked sputum, hoarseness and croupy cough, accompanied by more or less dyspnea. Gradual increase in the severity of these symptoms occurred over a period of days or weeks, during which dyspnea became the prominent symptom and was so extreme that tracheotomy was necessary. The extreme dyspnea was explained on the basis of subglottic edema. Five of the patients are still under treatment for laryngeal stenosis, and none of them have been able to dispense with the tracheal cannula. Iglauer and Molt suggest that, in the presence of an indwelling duodenal tube, any signs or symptoms indicating esophageal or laryngeal involvement demand an immediate examination of the larynx, and removal of the tube if the larynx or hypopharynx shows any sign of inflammation. They further urge that wherever feasible the tube should be removed and cleaned at frequent

intervals and reinserted through the opposite nostril. The use of a small tube is desirable whenever possible.

New Technic for the Repair of Laryngeal Paralysis

Bilateral paralysis of the abductor muscles of the vocal cords is most often the result of operative trauma in the neck, such as is sometimes seen in the complications after thyroidectomy, inflammatory processes in the neck or severe edema. This type of paralysis may also be the result of tabes or bulbar palsy. Occasionally, mediastinal growths may involve both recurrent laryngeal nerves. Various procedures have been devised and used for the relief of this condition. They may be classified under four headings: permanent tracheotomy, nerve suture, cordotomy or cordectomy and cord displacement. Since the object of any operation should be to restore the functions of phonation and respiration, none of these procedures have, in the opinion of King,¹² given satisfactory results. He noted that the suprahyoid muscles pulled the larynx up during swallowing, while the infrahyoid group, including the omohyoid muscle, pulled it down. He has devised an operation consisting essentially of transposition of the omohyoid muscle to the arytenoid cartilage in recent cases, plus laryngeal reconstruction in cases of old involvement with contracture. The operation is preceded by a preliminary tracheotomy, and four to six weeks are allowed for the patient to become accustomed to a tracheotomy tube and for infection to clear up. In brief the operation consists in mobilizing the anterior belly of the omohyoid muscle and attaching it by sutures to the posterior surface of the arytenoid cartilage. The esophagus is not entered. The arytenoid cartilage is mobilized by cutting the ligamentous capsule of its joint on three sides — mesial, outer and posterior, the last of which also divides the fibers of the cricoarytenoid muscle. Where the paralysis is of long standing, it is also advisable to divide the interarytenoid muscle and fascia and to sever the joint capsule.

Complications of Acute Obstructive Laryngitis and Tracheotomy

A review of the literature by Graebner¹³ shows that comparatively few cases of mediastinal emphysema incident to acute obstructive laryngitis have been reported. Pneumopericardium has never been described as a complication of this condition. On the Croup Service of the Willard Parker Hospital in New York City, 5 patients were observed who had one or the other of these complications. Two patients had pneumopericardium within twenty-four hours after tracheotomy was done, 2 had pneumomediastinum, and in one of these

cases it was noted that air was present in the tissues during operation, while in the other it developed two days later with the exacerbation of a previously mild bronchopneumonia. The remaining patient did not have a tracheotomy, and pneumomediastinum was found after cough and expectoration developed, with evidence of infection in the lower respiratory tract. All the patients had nonspecific croup. Pneumomediastinum may be the result of severe physical strain, attacks of coughing in pertussis, operative procedures on the neck, thorax and abdomen, and perforating wounds of these regions. The evidence presented in these cases indicates a direct relation of pneumomediastinum and pneumopericardium to obstruction of the upper or lower part of the respiratory tract rather than to tracheotomy. The route by which air enters the pericardial sac is not known. No specific measures were required in these patients other than relief of all obstruction to respiration.

Six cases of acute laryngeal obstruction are reported by Michels.¹⁴ Three of the patients died. Pneumothorax and mediastinal emphysema occurred in 5 cases following tracheotomy. Michels believes that these complications occur more often than the literature suggests. In relation to the mechanism responsible for pneumothorax there are several anatomical factors to be considered. Injury to the lung or the dome of the pleura may easily occur in children during tracheotomy because of the close relation of these structures to the trachea, this is especially likely to happen should the incision be too low or deviate from the midline. Incising the pretracheal fascia and lifting it away from the trachea may allow air to enter the mediastinum. Closing a recent tracheotomy wound by stitching may also cause mediastinal emphysema. The experimental production of pneumothorax and mediastinal emphysema by the intrapleural route, with direct rupture of the parenchyma and the pleura, according to Kirschner¹⁵ requires a pressure equivalent to 100 to 300 mm of water. The intrapleural route, with dissection of

minute globules of air from the interstitial tissues along the great vessels to the hilus, is probably a commoner one when intrapulmonic pressure is increased by cough or any severe and sudden strain. After tracheotomy or any endoscopic procedure the patient should be closely observed. Increasing respiratory embarrassment demands a careful survey of the chest, and fluoroscopy or the taking of roentgen-ray films if necessary. Pneumothorax may be recognized by greatly diminished excursion of the affected side, displacement of the heart to the opposite side and a diminution or absence of breath sounds. The percussion note is usually tympanic, but if the amount of air present is small and the bronchi are full of mucus, there may be dullness. Mediastinal emphysema may be recognized by crepitant sounds following each heart beat. Tympany may be present over the area normally occupied by cardiac dullness, and the apex beat is often lost to inspection and palpation. Early recognition of these conditions is important so that some form of drainage can be instituted.

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abated only with dilaudid. For one month prior to admission he noted many purpuric lesions in the skin of his feet. These became excruciatingly painful and required morphine for relief. An asthmatic attack occurred two days before entry and was characterized by wheezy breathing, dyspnea, orthopnea, a "tight chest" and the production of thick glairy mucoid sputum flecked with blood. Palpitation of the heart, without chest pain, was noted. Since his discharge he had taken Lugol's solution up to 100 drops a day. One week before re-entry he developed a swollen nose, noted excessive lacrimation and developed an iodine skin rash. The Lugol's treatment was stopped and relief was immediate. But on resumption of the therapy the same complications reappeared. It was, therefore, stopped permanently. The pressure sores on the sacrum and gluteal regions previously noted had failed to heal. He was readmitted for further study.

Physical examination revealed that there were numerous, red, small, crusted papules and comedones located over the back and chest. The hands, feet and lower legs were covered with small and large purpuric spots of varying ages. The eyelids were red and slightly swollen, and there was acrimation. The nose was crusted, and there was oozing about the external nares. The right radial artery showed a barely perceptible pulsation, but there was vigorous pulsation in a collateral vessel on the dorsum of the wrist. Many coarse dry rales were heard over the lung fields, and there were ill-defined areas of diminished intensity of breath sounds. The blood pressure was 14 systolic, 90 diastolic. The remainder of the examination was either unchanged or negative.

The blood showed a hemoglobin concentration of 80 per cent, with a white-cell count of 18,900 and a differential count as follows: polymorphonuclears 31 per cent, lymphocytes 20 per cent, monocytes 1 per cent, eosinophils 47 per cent and basophils 1 per cent, the red cells appeared normal. The serum nonprotein nitrogen was 30 mg per 100 cc. He ran a normal temperature throughout his hospital stay of five days. The pulse was slightly elevated.

Final Admission (three months later) The patient was fairly well after discharge. He gained 10 pounds and felt generally stronger, although he had several asthmatic attacks. About two and a half months after discharge he had a transient right hemiparesis with aphasia and convulsions. This recurred a few days later. In each instance there was complete return of muscle control. One week before entry he was examined by his physician and a urinous breath was noted. There were bilateral papilledema, exudates and hemorrhages in

the eye grounds. The blood pressure had risen to 240 systolic, 160 diastolic, and the nonprotein nitrogen was 50 mg per 100 cc. The urine showed a large trace of albumin, with a specific gravity of 1.010 and many red and white cells in the sediment. He was admitted to the hospital for terminal care and died on the second hospital day. The temperature was 99°F., the pulse 90, and the respirations 20. A lumbar puncture showed an initial pressure of 340 mm of water, and the spinal fluid gave a total protein of 40 mg per 100 cc., no cells were observed.

DIFFERENTIAL DIAGNOSIS

DR. ALFRED O. LUDWIG It seems to me that the outstanding features of the story were the asthma which this man had had for about six years before his final illness, the persistently high eosinophilic count in the blood, the weight loss, the cachexia, the purpura and finally the fairly rapid development of hypertension and signs and symptoms of acute nephritis and renal failure. In addition, he also had pain in the extremities and joints, pain in the abdomen, and later central nervous-system symptoms with hemiparesis, aphasia and convulsions. I believe that if we are going to explain this story on one basis we must make a diagnosis of extensive vascular disease of some sort, but it might be worth while to see if there are any other conditions that might fit the picture.

In any individual who has a high eosinophilic count in the peripheral blood one thinks of trichinosis as a possible diagnosis, but there is absolutely nothing else in this history to make me think of it. This man had pain in the extremities but there is no note that he had muscle tenderness or that he had the swollen eyelids, the hemorrhages in the ocular muscles so frequently seen in this condition, or any history of eating infected pork. One does occasionally see high degrees of eosinophilia in Hodgkin's disease, but again there is nothing in this history to allow one to make such a diagnosis.

One other possibility would be the presence of a leukemia, and yet the blood examination seems to me to have shown nothing that would permit one to consider this condition here.

There is a disease with which we have become increasingly familiar in the past few years,—in fact I have seen other cases very much like this one,—namely periantarctic nodosa. It is quite interesting that Rackemann and Greene¹ have described a series of cases in which asthma was a part of the disease. They reported 8 cases of their own all of which showed a high degree of eosinophilia. Asthma had been present from two

to twenty-seven years before the periarteritis could be diagnosed. We have no way of knowing whether it was present for all that time and in what way the asthma was associated. In addition to these 8 cases they found 27 others in the literature in which asthma and periarteritis had been present at the same time. The pathologic lesions in this disease are primarily vascular—perivascular infiltration with eosinophils, with involvement of the intima and thrombosis of numerous vessels, very often with the formation of small nodules and aneurysms. This may occur in small blood vessels anywhere, and on that basis, symptoms may occur in any system. One previous case that we saw here was erroneously diagnosed trichinosis because of severe pain in the arms and legs. A muscle biopsy was made which established the diagnosis. That patient lived six years after leaving the hospital.

The involvement of the various organs in periarteritis nodosa is of some interest. According to the literature^{2,3} the kidneys are involved in 80 per cent, the heart in 70 per cent, the liver in 65 per cent, the gastrointestinal tract in 50 per cent, the muscles in 30 per cent, the peripheral nerves in 20 per cent and the central nervous system in 8 per cent. Lesions of the most varied sort may take place. A group of cases has been reported² from the Mount Sinai Hospital in New York City, in which patients came in with abdominal pain suggesting appendicitis. The appendix was removed and found to contain thrombosed vessels due to periarteritis.

The eosinophilia which occurred in this case is by no means a common phenomenon in this disease. It so happens that most of the cases I have seen had eosinophilia, but in reported cases in the literature it occurred in 12 per cent. Usually there is a leukocytosis with a predominance of polymorphonuclear cells. A fairly severe secondary anemia is the rule. Many of the patients have hypertension. It is remarkable that more do not have hypertension when one considers the extensive vascular involvement that these patients may have, as well as the renal involvement. Neurologic manifestations may be extremely varied in their symptomatology, peripheral neuritis is not uncommon. The case which I described in which we erroneously made the diagnosis of trichinosis had extensive signs of peripheral neuritis, which when present is due to the same cause that produces symptoms in other systems, namely thrombosis of the small blood vessels, in this case the nutrient arteries of the peripheral nerves. So far as the central nervous system is concerned, almost any lesion may appear.⁴ These patients very

often run a fever. We have seen cases with low grade fevers—up to 100 or 102°F—persisting for many months. The signs and symptoms of coronary thrombosis may occur, and signs of renal failure, as in this case, are not uncommon.

There is one interesting point in this history—the blood Hinton test was negative. That is of interest because in some of the early cases syphilis was suspected as the etiologic agent inasmuch as there was aneurysmal dilatation in some of the vessels. A few cases were treated with arsphenamine, but not with any striking success.

The mortality in cases of periarteritis nodosa is extremely high. In the series of reported cases, now over 200, the mortality rates run between 90 and 95 per cent. I know of two patients who lived five or six years after the diagnosis was definitely made, and one continued to have rather severe asthma during that time. There has been a good deal of speculation about the cause of the eosinophilia, and it appears that the high eosinophilic count occurred rather regularly in those individuals who had asthma as a striking feature of the disease. Others have believed that the asthma was not sufficient to account for it. Some would explain eosinophilia in periarteritis on the basis of marked muscle degeneration. The muscles are involved in 30 per cent, and I do not believe this an entirely adequate explanation of the eosinophilia.

Another interesting observation by authors who have reported these cases was a very frequent history of sepsis shortly preceding the onset, and that was true here. This man had had severe sinus infection. Many organisms have been found to be associated with the disease, quite often the streptococcus. Others have claimed that there was a relation between this disease and rheumatic fever, but I do not believe it has been proved in any sense of the word. The general impression at the present time is that the etiology is unknown, but that there may be a sensitivity to the streptococcus or some of its toxic products. I think in one case someone succeeded in reproducing the disease in animals which he had sensitized with streptococci.

I shall make a diagnosis of periarteritis nodosa, which seems to me the only one on which one can explain the symptoms that were present in almost every system of the body, and I shall predict that he had fairly severe nephritis due to vascular changes—that probably being the reason for the sudden marked rise in the blood pressure—and central-nervous-system changes on the basis of small thromboses. There was probably also a fairly large perirenal hematoma. Hematomas of all sorts

are described extensively in this disease. One more point is that skin lesions occur in 15 per cent of the cases—nodules, purpura, rashes and actual necrosis occur. The fact that the pressure sores did not heal may mean that there were vascular lesions in association with them. However, the skin lesions in the presence of the swollen eyes and oozing nose may of course have been due to sodium.

DR. J. H. MEANS: Was a biopsy performed on the skin nodules?

DR. TRACY B. MALLORY: One was removed and proved to be something entirely inconsequential, a small fibroma. Have you any comments to make, Dr. Lyons?

DR. CHAMBERLAIN LYONS: Nothing, except to say that he was referred to me for study of a bacterial infection, the diagnosis of periarteritis nodosa was so obvious that even I made it right off and passed him on to the medical service.

DR. SEDGWICK MEADE: Do any of the cases with neurologic manifestations have subarachnoid hemorrhage?

DR. LUDWIG: Yes, one man with asthma and periarteritis, who is still living, came in here with a subarachnoid hemorrhage as the presenting symptom.

CLINICAL DIAGNOSIS

Periarteritis nodosa

DR. LUDWIG'S DIAGNOSIS

Periarteritis nodosa

ANATOMICAL DIAGNOSES

Periarteritis nodosa.

Cardiac hypertrophy, hypertensive type.

Endocarditis, healed, aortic valve (? rheumatic)

Arteriosclerosis, moderate, aorta and coronary arteries

Pulmonary emphysema, slight.

PATHOLOGICAL DISCUSSION

DR. MALLORY: Dr. Ludwig's diagnosis is correct. The only thing that one can be sure of in regard to cases of periarteritis nodosa is that no two of them will be alike. There is an infinite variation in clinical symptoms and anatomical findings because the process can be exaggerated in one system of the body and be entirely lacking in another. In this case the point of maximal involvement at the postmortem examination was unquestionably the kidneys. There was very severe disease of the large and medium sized arteries of the kidney. Throughout this case the lesions affected rather larger arteries than usual,

judging from our personal experience. The terminal arterioles are almost never involved, nor are the large arteries. The large arterioles and the very small arteries ordinarily show the maximal involvement, vessels just at the borderline of macroscopic visibility. In this case the lesions were most numerous in readily visible vessels from 1 to 2 mm in diameter. There had been very extensive destruction of the renal parenchyma, although the kidneys were still swollen rather than atrophic.

The heart weighed 500 gm., I believe as a result of the hypertension. The coronary arteries showed quite extensive atheroma of the major branches and very occasional periartheritic lesions of the small branches. These tended to be concentrated in the vessels supplying the right auricle, where several small thrombosed arteriolar aneurysms were found, which were around 1 or 2 mm in diameter. There was evidence of old endocarditis of the aortic valve, with fusion of two of the cusps. This seemed inactive, and we thought that it had nothing to do with the major process. The lungs were negative, and very scattered lesions were found elsewhere, except in the brain where once again there was considerable involvement with two quite definite gross infarcts in the basal nuclei. The great majority of the lesions were in an inactive state. Aneurysms had formed, the aneurysms had thrombosed, and the thrombi had undergone organization. It is, I think, quite possible that if the severe hypertension had not developed this man would have survived the acute stage of the disease and might have lived a number of years.

DR. ROBERT S. PALMER: What is the incidence of hypertension in the reported cases or the ones seen here?

DR. LUDWIG: So far as I know, no standard incidence has been given.

DR. MALLORY: An occasional case presents itself as one of malignant hypertension. The first case I ever saw was one of that type.

DR. CHESTER M. JONES: The cases we have seen here, as I recall, have at first been frequently diagnosed or considered peripheral neuritis or rheumatoid arthritis. I should like to know whether there have been any lesions found in the joints themselves. Have they been reported?

DR. LUDWIG: I did not find any such reports.

Was any peripheral-nerve change demonstrated histologically?

DR. MALLORY: It has been quite extensive in many cases. In this case we had sections of several nerves but found none.

DR. JONES: There is one patient that Dr. Rackemann and I saw who died apparently of heart failure plus very bad asthma and at autopsy, as

I remember, the bronchi were quite occluded by the mucus usually found in asthma

DR. MALLORY In this case there was a considerable amount of mucus in the smaller bronchioles, what one might well find in a chronic asthmatic patient between paroxysms, but not the extensive plugging that one finds with paroxysmal death

DR. LUDWIG The diagnosis is usually made by biopsy?

DR. MALLORY Yes, it almost always is

DR. JONES Abdominal pain can be excruciating at times, almost as severe as renal colic

DR. LUDWIG In one case described in the Mt Sinai group, the patient had thrombosis of the portal vein, furthermore, thrombosis of the mesenteric vessels is quite common

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CASE 26192

PRESENTATION OF CASE

A seventy-eight-year-old American physician entered the hospital complaining of abdominal distention, cramps and diarrhea

The patient had had no abdominal difficulty until approximately two and a half years before admission, when he experienced vague and diffuse abdominal pains which were rather discomforting but not crampy. These were associated with some diarrhea, and believing them to be due to a colitis, he took some medicine, which apparently relieved all his discomfort during the next few months. Since then he had had three or four similar attacks, each lasting two to four months, and each associated with shifting abdominal pains and diarrhea. Two months before entry he began having crampy abdominal pain, intermittent in character and lasting a few seconds at a time. The abdomen would become distended and definite peristaltic waves could be seen. Distention usually came on toward evening and was accompanied by cramps. Attacks occasionally came on at night, waking the patient. He continued to have diarrhea, usually four to seven stools a day, which often relieved the marked distention. As a rule the stools were watery to mushy and brown, without any blood. He passed a moderate amount of gas by rectum. During this two-month period he vomited about five or six times, the vomitus being green and

very sour. He believed he had lost some weight but did not know how much. His strength was fair until about two weeks previous to entry. His appetite was good.

The family and past histories were not contributory.

Physical examination showed a well-developed man who did not appear acutely ill. The chest was barrel shaped and symmetrical, and showed fair expansion. The heart seemed to be slightly enlarged to the left by percussion. The abdomen was markedly distended and tympanitic, and numerous peristaltic waves were observed. There was marked borborygmus, but no tenderness or definite masses. The prostate was moderately enlarged and symmetrical. The blood pressure was 142 systolic, 80 diastolic.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. The blood showed a red-cell count of 4,940,000, 141 gm of hemoglobin and a white-cell count of 7200 with 57 per cent polymorphonuclears. The stools were brown, and guaiac negative. A plain roentgenogram of the abdomen showed numerous dilated, gas-filled loops of small bowel and a moderate amount of gas in the transverse colon and in the region of the splenic flexure. Films taken in the upright position showed numerous fluid levels in the small intestine. A barium enema flowed to the cecum without delay, the colon was normal in position and mobility. The tip of the cecum was directed anterolaterally. In the region of the ileocecal valve there was a considerable area of narrowing and deformity which did not change during the examination. After evacuation the films showed this area to be still present. At no time was barium seen to enter the terminal ileum. Spot films of this area suggested the presence of mucosal folds passing through the area of narrowing.

He was given large amounts of intravenous glucose, and on the fifth day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. HORATIO ROGERS May I see the x-ray films?

DR. AUBREY O HAMPTON There are sets of plain films on two succeeding days, and at both times there is obvious evidence of small bowel obstruction. You can see dilated loops in both, but they are much more marked on the second day. There are fluid levels in the small bowel when the patient is upright. A barium enema shows a quite unusual defect in the cecum. It appears to be due to pressure from without, and yet the mass is quite intimate with the cecum.

You cannot separate the mass from the bowel. It is present in all films. There is another defect in the ileum, but the ileal mucosa appears normal. There is no real intussusception, yet the ileum points toward the cecum as though it were trying to intussuscept. The lumen of the ileum remains very narrow in all the films.

DR. ROGERS: What is meant by the statement, "The tip of the cecum was directed anterolaterally"?

DR. HAMPTON: I cannot prove it, but the cecum appears to be projected on end. It should go straight toward the pelvis. It has been displaced upward and anteriorly in some manner. In this spot film it looks as though there might be some thing in the wall of the cecum. In fact, on one side the defect looks like that due to carcinoma of the cecum, whereas on the other side it looks like that due to extrinsic pressure. In none of the other films does it look like a carcinoma of the cecum. I do not know whether I have made the picture clear. I shall conclude by saying that most of the disease here represented is extrinsic but also adherent to the ileum and cecum. The difficulty in studying the mucosa of the ileum is apparent when one notes how small the lumen is in the area of the mass.

DR. ROGERS: From the history we have a seventy-eight year-old man with a two-and-a-half year history of attacks of abdominal discomfort and diarrhea without blood and a two-month history of progressive intestinal obstruction, yet on admission he was not very ill and was ready for operation five days later. From physical examination we get confirmation of the fact that he was not very ill, and of obvious small-bowel obstruction. We also learn that there was no palpable mass. From blood studies we find that he had a practically normal red-cell count and no leukocytosis. X-ray examination revealed the facts that there was a pathologic lesion in the ileocecal region and that this probably originated outside the bowel.

We know that he had small bowel obstruction. The question is: What is the cause of the obstruction? There are three categories of causes that we must consider—mechanical, neoplastic and infectious.

Mechanical causes would include internal hernias, of which retroileal hernia is perhaps the commonest. The sigmoid colon rather than the cecum is the commonest area to show volvulus, and with volvulus I should expect the symptoms to be more acute. Intussusception is commonest in the ileocecal region, but bleeding is usually present and the x-ray picture should be more charac-

teristic. I think we can rule out a mechanical lesion as the cause of this condition.

In considering neoplasms, cancer of the cecum is by all odds the most likely. It cannot be that in this case, however, without being extremely atypical. Cancer of the cecum is characterized by rectal bleeding and by anemia. It could produce the diarrhea that this patient complained of, but by the time it had reached the size to give this x-ray picture it should have given anemia, some degree of cachexia and a palpable abdominal mass. I think we can safely rule out cancer of the cecum. Of the benign tumors of the cecum perhaps polyp is the only one to be considered, but not seriously. It might be a lipoma or carcinoid in the terminal ileum, but there is no evidence that this is a tumor of the small intestine, and there is a good deal of evidence from the x-ray films that it is not.

Chronic infections or the late results of acute infections must be considered. There is the hypertrophic type of tuberculosis of the cecum, which is characterized by diarrhea, usually with bleeding, and a destructive process which would be capable of producing small-bowel obstruction as a late result. But since it is usually accompanied by signs of tuberculosis elsewhere and rarely occurs in patients over forty, I do not believe we can consider it here. Regional ileitis is characterized by a long-continued diarrhea without bleeding and a certain degree of fever, debility and wasting, but that also is a disease of young adults, and the x-ray films, which should be characteristic, do not in the slightest suggest it in this case. We can dismiss chronic ulcerative colitis at once, because that is also a disease of young adult life which is characterized by diarrhea and bleeding and presents a typical picture in the colon by x-ray. Also, in ulcerative colitis the rectum is usually involved in the later stages, and in this case nothing is said about that. Diverticulitis is a disease which a man of this age could well have, but it usually occurs in the sigmoid, furthermore, the diverticula are usually multiple, and nothing is mentioned about them in the x-ray films of this patient.

This leads us to the conclusion that we are dealing with some benign condition—either a very unfamiliar one or a common one in unfamiliar guise. We must not forget that by all odds the commonest inflammatory disease of the abdomen is appendicitis and that at this age the symptomatology of appendicitis may be very atypical, the tendency being for a minimization of the symptoms, which are so clear in a younger patient. In spite of too much diarrhea and too little in the way of acute symptoms, this patient could have

had acute appendicitis two and a half years ago. He could have had a recurrence of it on several occasions afterward, with, at some time, abscess formation, absorption of the abscess and quieting down of the acute infection, and he could have been left with a great deal of scar tissue and dense adhesions around the cecum and terminal ileum—a condition which could produce this x-ray picture and result in obstruction of the terminal ileum without leukocytosis. I think that is what he had, and I am certain that the surgeon who operated on him was puzzled by what he found and that even possibly the pathologist was doubtful when he first saw the specimen.

DR F DENNETTE ADAMS: Dr Rogers may have been slightly misled by the history of the early part of this man's illness. The chief complaint was diarrhea. The episodes of pain which he had were not remarkable, as I obtained his history. There was no especially acute episode of pain until he began to get into trouble two and a half months before he was operated on.

DR ROGERS: Yes, that is the risk I am taking, if I am wrong, I expect to be very thoroughly wrong.

PREOPERATIVE DIAGNOSIS

Intestinal obstruction from carcinoma of cecum

DR. ROGERS'S DIAGNOSIS

Ileocecal obstruction from old appendiceal abscess

ANATOMICAL DIAGNOSIS

Carcinoid of the ileum

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY: Dr Rogers was wrong in two of his predictions: the case was not one

of appendicitis, and we do know what it was. The patient was operated on in two stages. At the first operation a mass was found in the region of the cecum and an anastomosis was done around it. I was called over at the time of the second operation and examined the specimen in the operating room. On opening the cecum and terminal ileum the mucosa of both was perfectly intact. There was no ulceration, but there was an obvious tumor mass that could be felt in the walls. Cutting through the mass showed it to be very firm tumor with about the texture and pattern of a fibroid of the uterus, except that it was bright orange-brown. The color reminded me immediately of adrenal tissue, but a frozen section showed that it was a carcinoid.

These are relatively rare tumors, yet this is the third that we have had in a very short period. The tumor primarily involved the ileocecal valve, with extension to both the ileum and cecum. The major portion was external to the bowel wall, however, and most of the x-ray deformity was produced by pressure of the external tumor.

DR. ROGERS: Is it not less common in the large than in the small intestine?

DR MALLORY: The commonest site of carcinoid tumors is the appendix, the next is the terminal ileum, and we have seen one case which we believe to be carcinoid of the rectum. They have been reported all the way from the stomach to the rectum, but the appendix and the lower ileum are the only common places.

A PHYSICIAN: How do you account for diarrhea being a presenting symptom?

DR MALLORY: I cannot account for it except that lesions in that area very frequently cause diarrhea, it seems to make no difference what the lesion is.

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HOSPITAL DAY

EIGHTEEN years ago Mathew Foley then editor of *Hospital Management* suggested that it would be appropriate to celebrate May 12, the birthday of Florence Nightingale, as Hospital Day. This original idea was warmly received, and Hospital Day has become generally accepted as the day on which hospitals are annually brought to public notice. It is appropriate, therefore, to consider at this time some of the problems that hospitals are facing.

Of late there has been much discussion of the relative merits of voluntary or non-governmental and tax-supported or governmental hospitals. Some enthusiastic supporters of "state medicine" have advocated the assumption by government of all medical activities, including the support and direction of hospitals. The place of voluntary hos-

pitals in the medical structure has been most ably set forth by Mr. A. V. J. Hinds,* of Liverpool, England, in a booklet entitled, *Hospital Testament*.

Mr. Hinds points out that there are arguments supporting both the voluntary and the tax supported hospitals, but that since the voluntary hospitals are doing their work efficiently and since taking over by governmental agencies would require a tremendous initial cost—unless confiscation were resorted to—and a continuing high operating cost, both of which would result in increased taxation, there is slight chance of serious consideration of such a step.

Furthermore, Mr. Hinds writes

It is clear that hitherto the voluntary hospitals have always attracted to themselves the most brilliant medical men. The merit of their organization is that they do in fact create rather than attract the best men. The width of experience available to the Honorary engaged partly in private practice and partly in hospital work has already been emphasized but there is an important aspect of it that needs elaboration. The Honorary work for the hospital as doctor, teacher and research worker must be maintained at the high standard which is necessary to provide him an income in his private practice. If the quality of his hospital work deteriorates his reputation is damaged and his private practice suffers. He thus has a constant incentive to achieve distinction which would be lacking if he were a salaried officer of the hospital, an incentive to give of his best to his hospital work—which is a public service—in order to benefit his private work which is his livelihood. Furthermore, his eminence in his profession is maintained only by the confidence of those he serves, and the persons who have the greatest say in giving him employment as a consultant in a private case are the general practitioners, members of his own profession who are judging him as expert.

Mr. Hinds believes sentiment alone is not sufficient to justify the continuation of voluntary hospitals. Therefore, he submits the following scientific arguments

1. The voluntary hospitals ensure that only the best brains of the medical profession are accorded distinction by subjecting them to the rigorous test of recognition by their practicing colleagues engaged in the same work in the same profession. They do not obtain positions of eminence as a result of selection and promotion decided solely by a political body or a lay administrator.

2. The voluntary hospitals ensure that the best brains of the medical profession are not only at the command of the wealthy but are also at the service of the public as practitioners in the hospitals. The benefits of first rate medical attention are not confined to one class of the community.

*Hinds, A. V. J., *Hospital Testament*. London: Hodder and Stoughton, Ltd. 1939.

3 The voluntary hospitals ensure that the best brains of the medical profession are not only engaged in the practice of medicine but are also at the disposal of the public as university teachers of medicine. There is no separation of the practical work from the teaching of it.

4 The voluntary hospitals ensure that for the performance of these public services the medical profession is remunerated, not by fixed salary, but indirectly by the rewards of private practice, in such a way, therefore, as to provide the maximum incentive for the achievement of excellence. There is no danger that a hospital appointment or a teaching appointment will be regarded as a sinecure.

5 The voluntary hospitals ensure that the teaching of medicine in the universities, and research into new methods of treatment in the hospitals, are guided and controlled by independent laymen whose loyalty to a single purpose permits and inspires them to provide the funds required for a bold policy of advancement in research. There is not the necessity to confine expenditure along the lines imposed by direct responsibility to the masses of the public.

6 The voluntary hospitals ensure that in one of the most important spheres of social life there is a variety of approach, on the one hand by public bodies, and on the other by private and voluntary institutions. The existence side by side of the two types of effort affords a useful basis of contrast, and a stimulus to friendly and healthy rivalry. Experiment of every kind is easier for the private and voluntary agency, but both types benefit from the results of research which proves itself successful.

There is a great similarity between the hospital systems of Great Britain and of the United States. Mr. Hinds's conclusions, therefore, may be applied aptly to the situation here, and Hospital Day seems to be a proper time to emphasize that there is work enough in this country for both voluntary and governmental hospitals and that the future of each lies not in competition but rather in co-operation with the other.

THE COMMERCIAL EXHIBITS

OF the sixty-five commercial exhibits that are scheduled for the annual meeting of the Massachusetts Medical Society this year, some have been arranged by old friends and others by newcomers. All exhibitors have gone to considerable trouble and expense to present attractive booths, which should be visited by the members of the Society for the purpose not only of gaining information but also of expressing appreciation for co-operation.

Few realize the extent of the financial support given to the Society by the exhibitors. This year

these firms are contributing more money than ever before for booth space and are thereby making it possible for the Society to continue the annual meetings at their present size without their becoming a financial drain. Furthermore, many of them support the *New England Journal of Medicine* by their advertising. The officers of the Society and of the *Journal* appreciate and value this support, but they realize that it will continue only so long as there is interest by the members in the products of these firms.

Every member of the Society who attends the annual meeting should take time to visit the various exhibits, and if he remembers the firm as an advertiser in the *Journal*, he should comment on that fact. Such interest will be well repaid by the exhibitors in their loyalty to the Society.

MEDICAL EPONYM

BROADBENT'S SIGN

Credit for the discovery of this sign must be given to Sir William Broadbent (1835-1907), although it was first described by his son, Walter Broadbent, in an article entitled "An Unpublished Physical Sign," which appeared in the *Lancet* (2200, 1895). Later in 1895 an elder son, John F. H. Broadbent, now Sir John, included a description of the sign in his book *Adherent Pericardium* (London, 1895). It was not until 1898 that Sir William published his description, which appears under the title "Adherent Pericardium" in the *Transactions of the Medical Society of London* (21: 109-122, 1898).

A systolic tug of the left false ribs posteriorly communicated by the diaphragm may be conspicuous. The recoil from the drag may be so distinct as to look and feel to the hand like pulsation, and in the first case in which I observed it, now more than twenty years since—a case of left empyema—it was taken for pulsation, and it was supposed that a pulsating tumour of some kind underlay the empyema. A *post-mortem* examination showed that the cause was adherent pericardium. I have often seen this tugging since, and in some cases it can be made to affect the right false ribs by causing the patient in the sitting position to lean over to the left so as to throw the drag of the heart upon the right half of the diaphragm. It must be added that this indication is not infallible, as the tugging has been observed when the heart was hypertrophied without adhesions.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

ANNUAL MEETING OF THE COUNCIL

The annual meeting of the Council will be held in the Swiss Room of the Copley Plaza, Boston, Tuesday, May 21, at 10.30 a.m.

BUSINESS

- 1 Presentation of record of meeting held February 7, 1940, as published in the *New England Journal of Medicine* for March 7, 1940
- 2 Nominating Committee retires to deliberate.
- 3 Reports of standing and special committees.
- 4 Election of officers and orator
- 5 Appointment of committees for ensuing year, both standing and special.
- 6 Incidental business.

ALEXANDER S. BEGG *Secretary*

Councillors are asked to sign one of the two attendance slips before the meeting. The Cotting Luncheon will be served immediately after the meeting

SECTION OF OBSTETRICS
AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., *Secretary*
330 Dartmouth Street
Boston

PYELITIS DURING PREGNANCY

Mrs. T., a twenty-six year-old para II, about twenty weeks pregnant, complained on November 6, 1912, of fatigue and fever. The temperature was 103°F., there was some urinary irritation.

The family history was negative. The patient had had infection of the mastoid as a child, and an abscess under conservative treatment burst externally. At the age of six she had had a period of unexplained fever lasting six to eight weeks. She had also had measles, and although intimately exposed, had never had scarlet fever. At the age of twenty-one she had had an attack of acute sinusitis, followed by a mild attack of rheumatic fever, the latter lasted about six weeks and left no sequelae. She had never undergone a surgical operation. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted five days with no discomfort. The last period was June 8, making the expected date of confinement March 15, 1913. The previous pregnancy had been normal throughout.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

She was first seen on August 12, at which time physical examination showed a well-developed and well-nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The blood pressure was 112 systolic, 60 diastolic. The breasts showed engorgement. The abdomen was normal. The uterus was anterior, and enlarged consistent with the period of amenorrhea. Examination of the extremities was negative, as was that of the urine.

The pregnancy was normal until November 6. At that time the urinary sediment contained a large amount of pus and the right kidney was definitely tender. A diagnosis of pyelitis was made, and conservative medical treatment was instituted—forced fluids, urotropin and sodium bicarbonate. The temperature ran an up-and-down course for ten days and then remained normal for about a week. Following no apparent in discretion the patient had a chill and the temperature rose abruptly to 103°F., with a pulse of 120. There was again much pus in the urine, and the patient had a great deal of bladder irritation. The attack lasted for about ten days, and then the temperature reached normal and remained so for another week. Another attack, similar to the two previous ones, followed. This time, as was very often done when the bladder showed marked irritation, a consulting urologist recommended that the bladder be irrigated with warm boric acid solution, however, no relief was obtained. These various attacks were accompanied by chills, general malaise, lack of appetite and marked despondency. The last one occurred six weeks before delivery. The pregnancy from then on showed no exacerbation of the pyelitis, and the baby was born on March 12, 1913, after a short normal labor.

Comment. This case illustrates the treatment of pyelitis of pregnancy at a time when it was entirely symptomatic and supportive. Nowadays bladder lavage is never considered. The subsequent history offers justification for the good prognosis that was offered patients suffering from pyelitis of pregnancy at that time. Since then the patient has had one other child, the pregnancy being complicated by pneumonia at seven months, has undergone an operation for intestinal obstruction and has had frequent gallstone attacks, but has never had subsequent attacks of pyelitis. Today at the age of fifty-four the blood pressure is 116 systolic, 60 diastolic, and the urine is normal.

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MASSACHUSETTS MEDICAL SOCIETY

THE ONE HUNDRED AND FIFTY-NINTH ANNIVERSARY

Tuesday and Wednesday, May 21 and 22, Copley Plaza Hotel, Boston

The exercises of the one hundred and fifty-ninth annual meeting of the Society will be held at the Copley Plaza Hotel, Boston, on May 21 and 22. Members of the medical profession are invited to attend.

The Committee of Arrangements in charge of this year's meeting consists of Drs. Augustus Thorndike Jr., chairman, Edward J. O'Brien, William T. O'Halloran, James A. J. Foster and George P. Sturgis.

With the exception of some of the section round-table meetings and luncheons, all the meetings will be held in the Copley Plaza Hotel. The commercial exhibits will fill the ballroom and part of the foyer while the unusually interesting scientific exhibits will take the balance of the foyer, the balcony boxes and the east corridor of the main floor. At the end of the east corridor will be a continuous moving-picture exhibit of medical pictures. The program has been selected with care and contains a number of pictures made by members of the Society which should prove interesting and instructive.

The members' registration desk will be in the main ball room, and it is hoped that everyone who attends will register.

The annual dinner and the Shattuck Lecture will be held on the same evening Tuesday May 21.

The golf tournament will be held at the Belmont Country Club on Tuesday May 21.

Section round-table meetings and luncheons will take the place of the section meetings of other years. As it is necessary to have beforehand some idea of the number who will attend these luncheons, all members are urged to notify the committee at once if they plan to come.

TUESDAY MAY 21

General Clinical Meeting

9:00 to 12:00

SHERATON ROOM

Chairman Dr. A. Warren Stearns

9:20 *Tumors of the Breast* Dr. Grantley W. Taylor, Boston.

9:35 Discussion by Dr. Shields Warren, Boston.

9:45 *Treatment of Prostatic Obstruction* Dr. Reed Nesbit, Ann Arbor, Michigan.

10:15 Discussion by Dr. William C. Quinby and Dr. Fletcher H. Colby, Boston.

10:25 *Acute Surgical Emergencies of the Abdomen in Pregnancy* Dr. Judson A. Smith and Dr. Marshall K. Bartlett, Boston.

10:40 Discussion by Dr. Howard M. Clute, Boston.

INTERMISSION

11:00 *The Relation of Urinary-Tract Infections to Hypertension* Dr. Soma Weiss, Boston.

11:15 Discussion by Dr. Allan M. Butler and Dr. Robert S. Palmer, Boston.

11:25 *The Treatment and End Results of Plantar Warts* Dr. Joseph H. Marks and Dr. Clifford C. Francis, Boston.11:35 *The Diagnosis of Marie-Strümpell Arthritis with Certain Aspects of Treatment* Dr. Hugh F. Hare, Boston.

11:50 Discussion by Dr. Charles L. Short, Boston.

Supervising Censors Meeting (PARLOR A) 10:00

Council Meeting (SWISS ROOM) 10:30

Nominating Committee (PARLOR A)

Cotting Luncheon (SWISS ROOM) 1:00
(following Council Meeting)Section Round Table Meetings and Luncheons
12:00 to 2:00

All round-table luncheons will be \$1.00. Reservations should be made at once.

Section of Medicine

PRESIDENT'S ROOM, UNIVERSITY CLUB

Chairman Dr. Chester M. Jones, Boston.

Secretary Dr. Erwin C. Miller, Worcester.

Subject *Toxic Manifestations of Important Drugs*

Section of Obstetrics and Gynecology

MAIN DINING ROOM, UNIVERSITY CLUB

Chairman Dr. Roy J. Heffernan, Brookline.

Secretary Dr. Raymond S. Titus, Boston.

Subject *Abnormal Uterine Bleeding* Leader Dr. Frank A. Pemberton, Boston, assisted by Drs. Thomas Almy, Fall River; Robert J. Carpenter, North Adams; and Joel M. Melick, Worcester.

Section of Surgery

CRYSTAL ROOM, WESTMINSTER HOTEL

Chairman Dr. Reginald H. Smithwick, Boston.

Secretary Dr. Bancroft C. Wheeler, Worcester.

Subject *Vitamins and Surgery*

Section of Pediatrics

BALLROOM, WESTMINSTER HOTEL

Chairman Dr Charles F McKhann, Boston

Secretary Dr James M. Baty, Boston

Subject *Allergy in Childhood*

Section of Dermatology and Syphilology

STATE SALON, COPLEY-PLAZA HOTEL

Chairman Dr C Guy Lane, Boston

Secretary Dr John G Downing, Boston

Subject *Skin Manifestations on Extremities*

General Clinical Meeting

2 00 to 5 00

SHERATON ROOM

Chairman Dr William H Robey

2 00 *The Common Cold* Dr Wilson G Smillie, New York City

2 20 Discussion by Dr Arlie V Bock, Cambridge

2 30 *The Relation of Sinus Infection to Chronic Non-Tuberculous Pulmonary Infection* Dr Robert L. Goodale, Boston.

2 45 Discussion by Dr Charles F McKhann and Dr Philip E. Meltzer, Boston.

2 55 *The Surgical Treatment of Chronic Lung Abscess* Dr Edward D Churchill, Boston

3 10 Discussion by Dr Thomas H Lanman and Dr John W Strieder, Boston

INTERMISSION

3 30 *Tuberculosis in Childhood* Dr Edith M Lincoln, New York City3 50 *The Pathogenesis of Primary and Reinfection Types of Pulmonary Tuberculosis* Dr Esmond R. Long, Philadelphia

4 10 Discussion by Dr Henry D Chadwick, Newton.

4 20 *The Treatment of Pneumococcal Pneumonia* Dr Francis G Blake, New Haven, Connecticut.

4 50 Discussion by Dr Kenneth D Blackfan and Dr Donald S King, Boston

Annual Dinner (MAIN DINING ROOM) 7 00

The Shattuck Lecture (SHERATON ROOM) 8 45

Immunity to Virus Diseases Some theoretical and practical considerations Dr Ernest W Goodpasture, professor of pathology, Vanderbilt University School of Medicine, Nashville, Tennessee

WEDNESDAY, MAY 22

Symposium on Syphilis

9 00 to 11 00

SHERATON ROOM

Chairman Dr C Guy Lane

9 00 *The Clinical Manifestations of Primary Syphilis* Dr Francis M. Thurmon, Boston.9 15 *The Interpretation and Reliability of Reports of Serologic Tests for Syphilis* Dr Tracy B Malory, Boston.9 30 *The Detection and Treatment of Cardiovascular Syphilis* Dr Herrman L Blumgart, Boston.9 45 *The Early Clinical and Laboratory Manifestations of Central-Nervous-System Syphilis* Dr H. Houston Merritt, Boston.10 00 *The Public Health Aspects of Syphilis as it Concerns the General Practitioner* Dr Thomas Parran, Washington, D C

10 30 Discussion by Dr Rudolph Jacoby, Dr Austin W Cheever, Dr Howard B Sprague, Dr James B Ayer and Dr Dwight O'Hara, Boston.

Annual Meeting (SHERATON ROOM) 11 00

Annual Oration (following meeting)

New England, Neurosurgery and the Neurosurgeon Dr William Jason Mixter, Boston.

Annual Luncheon (SWISS ROOM) (following oration)

Symposium on Sulfanilamide

2 00 to 5 00

SHERATON ROOM

Chairman Dr Reginald Fitz

2 00 *The Management of Acute Streptococcal Infections of the Upper Respiratory Tract* Dr Conrad Wesselhoef, Boston.

2 15 Discussion by Dr Gordon Berry, Worcester

2 25 *The Treatment of Puerperal Sepsis* Dr Joseph P Cohen, Boston.

2 40 Discussion by Dr Champ Lyons, Boston

2 50 *The Treatment of Urinary-Tract Infections by Specific Therapy* Dr E Granville Crabtree, Boston.

3 05 Discussion by Dr George Gilbert Smith and Dr Samuel N Vose, Boston.

INTERMISSION

3 30 *The Diagnosis and Treatment of Gonorrheal Arthritis* Dr Chester S Keefer, Boston.

3 45 Discussion by Dr Walter Bauer, Boston.

3 55 *The Treatment of Meningococcal Meningitis* Dr Edwin H. Place, Boston.

4 10 Discussion by Dr LeRoy D Fothergill, Boston.

4 20 *The Possible Skin Manifestations of Sulfanilamide* Dr Arthur M. Greenwood, Boston.

4 30 Summary Dr Perrin H Long, Baltimore, Maryland

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Moving Pictures

9 30 to 4 30

EAST CORRIDOR, COPLEY-PLAZA HOTEL

Tuesday — May 21

9 30 *The Valves of the Heart in Action*

- 9-45 *The Mechanism and Electrocardiographic Registration of the Heart in Health and Disease* (2 reels)
- 15 *Epiatomy and Repair* (3 reels)
- 30 *Postpartum Hemorrhage*
- 15 *The Transverse Cervical Cesarean Section*
- 30 *Differential Diagnosis of Vomiting in the Newborn*
- 45 *Tuberculosis in Childhood*
- 30 *Action of Drugs on Intestinal Motility*
- 15 *The Use of the Miller Abbott Tube for Decompressing the Small Bowel in Certain Types of Intestinal Obstruction* (2 reels)
- 45 *The Use of Extra-Fine Catgut in Gastrointestinal Surgery*
- 30 *Complete Colectomy for Ulcerative Colitis*
- 15 *Hernioplasty for Left Indirect Inguinal Hernia*
- 45 *Teaching Diabetics*
- 30 *Newton Conquers Diphtheria*
- 15 *Diagnostic Procedures in Tuberculosis*

Wednesday—May 22

- 30 *The Darkfield Diagnosis of Primary Syphilis*
- 45 *Technical Aspects of Intravenous Serum Treatment of Pneumonia*
- 15 *Acute Appendicitis*
- 45 *Blood Studies in Shock as a Guide to Therapy*
- 30 *Treatment of Burns* (2 reels)
- 30 *Use of Russell Traction in Fractures of the Femur*
- 45 *The Treatment of Infantile Paralysis*
- 30 *Mental Deficiency Due to Birth Injury*
- 15 *Mayo Vaginal Hysterectomy*
- 30 *Methods for the Determination of Bleeding Tendency*
- 45 *Cholecystectomy and Cholelithotomy*
- 30 *Dividing Cancer Cells in Vitro*
- 15 *Radical Mastectomy*
- 30 *Technique of Blood Transfusion*
- 30 *The Use of Placental Blood for Transfusion*
- 15 *Child-Guidance Work*

Richard Dresser Walter E. Garrey Francis M. Thurmon, G. Marshall Crawford William Dame shek and Kurt Thoma.

- 71 *Morphologic Biology of Tuberculosis* Massachusetts Tuberculosis League. Exhibitors Miss E. I. Perkins and Miss M. Dinsmore.

BALCONY

- 1 *Color in Medical Photography* Fallon Clinic, Worcester Exhibitors Drs. John Fallon James T. Brosnan and William G. Moran.
- 2 *Reconstructive Surgery* Massachusetts General Hospital. Exhibitors Drs. Ernest M. Daland and Somers H. Sturgis.
- 3 *Blood Pictures* Peter Bent Brigham Hospital. Exhibitors Dr. William P. Murphy and Miss Isabel Howard.
- 4 *The Surgical Treatment of Acute Cholecystitis* Peter Bent Brigham Hospital. Exhibitors Drs. Elliott C. Cutler and Robert M. Zollinger.
- 5 *Fractures and Pseudo-Fractures* The Faulkner Hospital. Exhibitors Drs. Gordon M. Morrison and Harvey R. Morrison.
- 6 *Blood Pressure Determinations by Patients with Essential Hypertension* Department of Medicine, Tufts College Medical School and the Beth Israel Hospital. Exhibitors Drs. David Ayman and Archie D. Goldshine.
- 7 *Occupational Disease Prevention*. The Division of Occupational Hygiene Massachusetts Department of Labor and Industries, and Committee on Industrial Hygiene, Dr. W. Irving Clark, chairman Massachusetts Medical Society Exhibitors Mr. Manfred Bowditch Dr. Hervey B. Elkins and Mr. W. C. L. Hemen.
- 8 *Results of Chronic Exposure to Benzol*. Exhibitors Dr. William J. Brickley medical examiner Suffolk County North, and Drs. Tracy B. Mallory Francis T. Hunter and Edward A. Gall Massachusetts General Hospital.
- 9 *Transurethral Resection of the Prostate—Cystoscopic Photography* Massachusetts General Hospital. Exhibitors Drs. Fletcher H. Colby and Howard L. Suby.

EAST CORRIDOR

- A-B *Diseases of the Thyroid Gland*. Lahey Clinic.

Cancer of the Thyroid Gland Drs. Hugh E. Hare and Shields Warren.

Anesthesia in Thyroid Surgery Dr. Morris J. Nicholson.

The Larynx and Thyroid Surgery Dr. Walter B. Hoover.

Orbital Decompression for Progressive Exophthalmos Dr. James L. Poppen.

Clinical Features of Hyperthyroidism Dr. Lewis M. Hurxthal.

The Heart in Hyperthyroidism Dr. Lewis M. Hurxthal.

Iodine Metabolism in Thyroid Disease Dr. H. Perkin.

- C-D *Clinical Surgery and Chemotherapy* The staff of the Children's Hospital. Exhibitors Drs. John A. V. Davies, Robert E. Gross, Henry W. Hudson Jr., and Donald W. MacCollum.

Scientific Exhibits

LOBBY

- 30th AB *Shellfish Mosquitoes* Massachusetts Department of Public Health.

Foyer

- 4-66 *Brush and Pen Illustrations in the Field of Medicine* Truesdale Hospital Fall River. Exhibitors members of the staff of the Truesdale Hospital.
- 4-68 *Diabetes Today* George F. Baker Clinic, New England Deaconess Hospital, Boston. Exhibitors Drs. Elliott P. Joslin Howard F. Root, Priscilla White Alexander Marble and Allen P. Joslin and Miss Hazel M. Hunt.
- 4-70 *The Tumor Clinic of the Boston Dispensary New England Medical Center* New England Medical Center Exhibitors Drs. Louis E. Phaneuf

E-F *First Aid in Highway and Sking Accidents* Massachusetts Regional Committee on Fractures and Trauma of the American College of Surgeons (Dr A William Reggio, chairman), Boston Metropolitan Chapter of the American Red Cross (Dr A William Reggio and Mr George P Johnson) and National Ski Patrol (Dr Charles C Lund and Mr Robert Livermore, Jr)

G *Color Photography in Skin Diseases* Boston City Hospital Exhibitor Dr George Schwartz

Additional Exhibits

BALLROOM

Massachusetts Association of Occupational Therapy

FOYER

Central Directory for Nurses

Commercial Exhibits

BALLROOM AND FOYER

Booth

- 1 Ernst Bischoff Company, Incorporated, Ivoryton, Connecticut.

In our exhibit we shall feature Activin, the first American produced shockless foreign protein for non-specific therapy, Diatussin, the original drop-dose cough remedy with a thirty five year record of efficacy, Lobelin-Bischoff, a direct stimulant to the respiratory center and the resuscitant indicated in all forms of respiratory failure or depression, Silvogon, an absolutely stainless silver antiseptic and an effective gonocide, Styptysate, a vegetable hemostatic for the control of all seeping hemorrhages, Viscysate, a dialysate of viscum album that lowers blood pressure and relieves the accompanying symptoms

- 2 Eli Lilly and Company, Indianapolis, Indiana

Eli Lilly and Company produced the first commercial preparation of insulin, contributed to development of liver therapy, and has been responsible for many other therapeutic advancements. Information concerning all Lilly products will be available at the Lilly exhibit where Merthiolate (Sodium Ethyl Mercury Thiosalicylate, Lilly), Sodium Amytal (Sodium Isoamyl Ethyl Barbiturate, Lilly) and other important products will be featured.

- 3 Philip Morris & Company, Limited, Incorporated, New York City

Philip Morris & Company will demonstrate the method by which it was found that Philip Morris Cigarettes, in which diethylene glycol is used as the hygroscopic agent, are less irritating than other cigarettes. Their representative will be happy to discuss researches on this subject, and problems on the physiological effects of smoking.

- 4 M & R Dietetic Laboratories, Incorporated, Columbus, Ohio

M & R Dietetic Laboratories, Incorporated, will display Simulac, a completely modified milk for infants deprived of breast feeding. Representatives will gladly explain its merit and suggested application.

- 5 Bilhuber-Knoll Corporation, Orange, New Jersey

At this booth the use of Metrazol to overcome barbiturate or opiate poisoning, surgical shock and asphyxia can be discussed, also the advantages of Dilaudid Hydrochloride for pain relief and for cough sedation, and Theocalcin as a diuretic and myocardial stimulant. Other well-known medicinal chemicals exhibited by the Bilhuber-Knoll Corporation include Euresol, Lenigallol and Bromural. Helpful prescription information on any of these products is available.

- 6 Jones Metabolism Equipment Company, New York City

The Jones Metabolism Equipment Company invites you to see the original waterless metabolism apparatus. The exclusive features of the Jones apparatus include a double slope tracing which eliminates the possibility of technical errors, a simplified and accurate slide rule for calculations, and the life time guarantee of accuracy greater than 99 per cent. The twenty years of experience of the Jones Metabolism Equipment Company have made it possible for them to produce a fool proof, simple and accurate machine.

- 7 Kalak Water Company, New York City

Visit this booth and ask the Kalak representative to explain to you how Kalak Water may be employed as a buffer to inhibit the untoward effects and enhance the value of certain drugs.

- 8 Liebel-Flarsheim Company, Cincinnati

The Liebel-Flarsheim Company will exhibit the well known L-F short wave generators as well as the famous Bovie electrosurgical units and the Rayson therapeutic lamp. A cordial invitation is extended to visit this booth in order to inspect the new apparatus and have it demonstrated.

- 9 Doho Chemical Corporation, New York City

Auralgan acts physiologically in acute otitis media by depleting the involved tissues of their excess fluid, and does not produce traumatic chemical changes in the superficial epithelium of the drum.

- 10-11 G D Searle and Company, Chicago

The Phantascope, familiar to many New England physicians, will be on exhibition by G D Searle and Company. This ingenious device, developed by Dr George Levene of the Massachusetts Memorial Hospitals, accurately reproduces the fluoroscopic appearance of the chest, and enables the physician to view in motion the alterations in cardiac size, rhythm and contour in a variety of typical pathologic conditions.

A number of Searle representatives will be in attendance, and physicians are cordially invited to discuss with them various products of the Searle laboratories.

- 12 Mead Johnson and Company, Evansville, Indiana.

Mead Johnson and Company will not only exhibit several new products, but will show various examples of its slogan "Servamus Fidem" — "We Are Keeping The Faith."

- 13 The Macmillan Company, New York City

Four authors on the staff of the Harvard Medical School will be represented by three outstanding books of the year. Elliott Cutler and Robert Zollinger by

their *Atlas of Surgical Operations* John Homans by *Circulatory Diseases of the Extremities* Lyman G Richards by *Otolaryngology in General Practice* Also prominent in the exhibit will be William Holmes' *Bacterial Infections and Biochemistry of Disease* by Oscar and Meyer Bodansky both spring publications. Many other notable Macmillan medical works will be shown.

14. White Laboratories, Incorporated Newark, New Jersey

Information will be presented covering the field of cod-liver oil concentration and clinical data concerning the therapeutic efficacy of White's Cod-Liver Oil Concentrate in liquid, tablet and capsule form.

Informed representatives and descriptive literature, reprints and excerpts will further demonstrate cod-liver oil efficacy and will point out the contributions of White Laboratories, Incorporated, in the vitamin A and vitamin D fields.

White Laboratories, Incorporated is one of the largest users of cod-liver oil for pharmaceutical purposes in the world. All physicians are cordially invited to visit the booth.

15. Baby's Dy Dee Service, Brookline, Massachusetts.

This exhibit explains in detail the specialized equipment and methods used in sterilizing and supplying diapers to homes in Greater Boston. In its seventh year this service has relieved thousands of mothers and nurses of the daily drudgery of washing diapers and baby clothes, at the same time protecting the baby's health by scientific methods impossible at home. An economical service, devoted exclusively to the baby.

Represented by Helen Lauriat Lyman and Faye Reynolds Rand.

16. General Electric X-ray Corporation Chicago.

A portable x ray machine, an electrocardiograph and an electrosurgical unit and x ray films will be exhibited.

17. The E. L. Patch Company Stoneham Massachusetts.

The Patch Company representatives will be on hand throughout the meeting to greet physicians and to be of service in any way. The Patch Company exhibit will include Patch's Cod Liver Oil as well as the other ethical medicinal specialties made in the Patch laboratory.

18. Crosbie-Macdonald Boston.

We represent the United States Fidelity and Guaranty Company writing physician's liability insurance for members of the Massachusetts Medical Society. George H. Crosbie, Edward J. O'Neil Jr., or Arthur H. Crosbie will be on hand at all times to discuss any questions pertaining to insurance and to quote rates for your specialty. We are notaries public, and should be glad to sign and file your narcotic drug blanks.

19. Campbell X Ray Corporation Boston.

Campbell X Ray Corporation will exhibit a new type of shock proof apparatus and various new accessory equipment.

20. Arlington Chemical Company Yonkers New York.

The Arlington Chemical Company invites you to inspect its line of proteins and pollens for the diag-

nosis and treatment of allergic conditions and its new product—Aminoids. Aminoids represents a combination of amino acids and has proved of marked therapeutic value in malnutrition underweight and loss of appetite.

Dr J R. Taylor in charge of the exhibit, will be happy to answer inquiries regarding this new product also inquiries relative to hay fever asthma and so forth.

21. E. F. Mahady Company

22. The Picker X Ray Corporation, Boston.

The Picker X Ray Corporation takes pride in announcing and showing the new Century X Ray Unit—a new high in x ray design and a new low in price. The Century with its many additional and exclusive features, is the most sensational x-ray apparatus in the low-price range.

It provides for radiography and fluoroscopy in all positions from Trendelenburg to vertical. It has ample power for fast chest and gastrointestinal radiography. It is completely shockproof in every particular with flexibility power and simplified control for every diagnostic procedure, and is available with a motor-driven table if desired. It behooves the modern medical practitioner to see this Century unit.

At the Picker booth are numerous accessories of recent and outstanding design that are of special interest to the profession. Ask for bulletins and literature.

24. Horlick's Malted Milk Corporation Racine, Wisconsin.

Nourishing, digestible, appetizing—these are the three outstanding qualities for which Horlick's is famous, whether in powder or tablet form. Visit the exhibit. You will be interested in the many uses—from infancy to old age—note especially the convenience of the tablets in ulcer diets.

25. Davies, Rose and Company Limited Boston.

Members of the Massachusetts Medical Society are so well acquainted with the products of the laboratory of Davies, Rose and Company that no further explanation of their merits is really necessary. However the company trusts that you will visit its booth and give its representatives the honor of greeting you. Messrs. Fleming and Purinton will be in attendance.

26. Frederick Stearns and Company Detroit.

Doctors are cordially invited to visit our attractive booth to view and discuss outstanding contributions to medical science developed in the scientific laboratories of Frederick Stearns and Company. Information on such outstanding products as Neo-Synephrin in its various dosage forms, Appella Apple Powder Muclose, Trimax (hydrated magnesium trisulfate) vitamin products, Solution Zinc Insulin Crystals-Stearns Cyverine Hydrochloride, Gastric Mucin and other new and interesting products will be supplied by our capable representatives.

27. The Alkalol Company Taunton Massachusetts.

Alkalol is a carefully balanced solution of alkaline and saline salts and essential oils. It contains no glycerin and only a trace of alcohol. It is indicated for use on the mucous membranes and on inflamed or irritated tissues. Alkalol was first introduced to the medical profession in 1896. Since that time it has won

and retained the endorsement of thousands of physicians

Irrigol, also a product of The Alkalol Company, is an alkaline, saline douche powder. It makes a solution that is cleansing, non-irritating, non-toxic and delightfully fragrant, cooling and comforting. Physicians find it valuable for rectal enemas and ordinary colonic irrigations, as well as for routine vaginal douching. It has been on the market since 1907.

28 Westinghouse X-Ray Company, Incorporated

Westinghouse X-Ray Company, Incorporated, will exhibit for the first time in the East the new Simplex Unit.

This unit is the latest development in high powered shockproof diagnostic equipment for both vertical and horizontal fluoroscopic and radiographic work. It is economical in its space requirements and economical in use.

29-30 Burroughs Wellcome and Company, Incorporated, New York City

The Burroughs Wellcome and Company exhibit presents a representative group of fine chemicals and pharmaceutical preparations, together with new and important therapeutic agents of special interest to the medical profession.

31 The DeVilbiss Company, Toledo, Ohio

The complete DeVilbiss line of medicinal atomizers will be on display. Specially featured in the exhibit are illustrations graphically showing the superior coverage afforded by the atomizer in the application of solutions to the nose and throat. These illustrations are based on x-ray research. Copies of the illustrations for reference may be secured from Mr. E. Manning, DeVilbiss representative in charge of the display.

32. Hanovia Chemical and Manufacturing Company, Newark, New Jersey

The very latest in ultra-violet equipment will be demonstrated, including outstanding apparatus designed for use in the fields of medicine and public health. Do not fail to see our new line of self-lighting ultra-violet high pressure mercury arc lamps, short wave and ultra short wave apparatus, Sollux radiant-heat lamps and our latest development, quartz ultra-violet lamps for air sanitation.

33 Petrolagar Laboratories, Incorporated, Chicago

Petrolagar Laboratories, Incorporated, offers in addition to samples of the five types of Petrolagar, an interesting selection of descriptive literature and anatomical charts. Ask one of the Petrolagar representatives to show you the new *Habit Time* booklet. It is a welcome aid for teaching bowel regularity to patients.

34 S. M. A. Corporation, Cleveland

The S. M. A. Corporation exhibits an interesting new display, which represents a selection of its infant feeding and vitamin products. Physicians who visit this exhibit may obtain complete information, as well as samples, of S. M. A. Powder and the special milk preparations—Protein S. M. A. (Acidulated), Alerdex and Hypo-Allergic Milk.

35 John Wyeth and Brother, Incorporated, Philadelphia

Among the specialties to be presented by John Wyeth and Brother are Amphogel, Wyeth's alumina gel, the management of hyperacidity and peptic ulcers; Kaomagma, Wyeth's magma of alumina and kaolin for the absorbent treatment of diarrhea and colitis; Alulotion, ammoniated mercury with kaolin for treatment of impetigo contagiosa; Bepron, Wyeth's beef liver with iron, for the treatment of nutritional anemias; and Silver Picrate, for the convenient treatment of trichomonas vaginitis and anterior urethritis. Physicians are invited to stop at Wyeth's display.

36 The Borden Company, New York City

Full information on Biolac, the new liquid modified milk for infants, will be available at the Borden booth. Also exhibited will be other Borden products for infant feeding, notably Klim, Dryco, Beta Lactose, Mer Soule products and Borden's Irradiated Evaporated Milk.

37 Bard Parker Company, Incorporated, Danbury, Connecticut

Bard Parker will exhibit the following products: rib-back surgical blades, renewable-edge scissors, the Ortholator case for obtaining blood samples at the side, Ortholator for obtaining accurate dental radiographs, Formaldehyde Germicide and instrument tainers for the rust proof sterilization of surgical instruments.

38 The Zemmer Company, Incorporated, Pittsburgh

The Zemmer Company extends a cordial invitation to every member of the Massachusetts Medical Society to visit its exhibit where there will be display of a number of its leading pharmaceutical products.

39 Winthrop Chemical Company, Incorporated, New York City

Winthrop Chemical Company, Incorporated, extends a cordial invitation to visit its booth, where representatives will gladly discuss the latest contributions made by this firm to the medical profession.

40 Nu-Hesive, Incorporated, Leominster, Massachusetts

Nu-Hesive, Incorporated, will exhibit and demonstrate Nu-Hesive, a new principle in surgical dressings which opens up a wide possibility of new technique to the doctor.

41 Surgeons' and Physicians' Supply Company, Boston

Surgeons' and Physicians' Supply Company will display the new Complex short wave machine, the McKesson waterless metabolizer, and an interesting collection of new items many of which are not usually shown by the salesman.

42 Mellin's Food Company, Boston

Members of the Society are cordially invited to stop at the Mellin's Food booth for an exchange of views and opinions relative to the feeding of infants and regard to the preparation of nourishment for adults requiring a restricted diet, particularly in view of the recognized importance of selecting food material adapted to individual requirements.

43. The Medical Protective Company, Wheaton, Illinois.

The most exacting requirements of adequate liability protection are those of the professional liability field. The Medical Protective Company specialists in providing protection for professional men invites you to confer at its exhibit, with the representative there. He is thoroughly trained in professional liability under writing.

44. Tailby-Nason Company, Boston.

Tailby-Nason Company has reserved space for the exhibit of Nason's Palatable Cod Liver Oil, made in the company's own plants in the Lofoten Islands of Norway romantic Land of the Midnight Sun.

More and more leading physicians are relying on good cod-liver oil in all cases requiring vitamins A and D. Nason's Oil is prescribed and recommended by leading pediatricians from the Atlantic to the Pacific for its high vitamin potency and unusual palatability.

45. C. B. Fleet Company, Incorporated, Lynchburg, Va.

Phospho-Soda (Fleet) the buffered saline laxative, combines two U.S.P. salts of sodium phosphate in a stable concentrated solution of broad therapeutic range and is free from most of the disadvantages of saline laxatives.

May we remind you of—

Its ease of administration and mild after-effects.

Its wide range of action, from gentle laxative to purge.

Its rapidity (action usually within the hour)

Its effectiveness in hepatic insufficiency

Its amphoteric neutralizing quality

Its stability, miscibility and economy

Please note the new descriptive leaflet on your professional samples.

46. Gerber Products Company, Fremont, Michigan.

Ten new foods which have just been added to the Gerber foods will be on display in the Gerber booth. Copies of both the professional literature and the booklets for mothers are there for your examination and will be sent to you on request.

47. Smith Kline and French Laboratories, Philadelphia.

Smith Kline and French Laboratories, believing that many physicians dislike efforts to make them register have arranged their booth for self service.

Up-to-date information about Benzedrine Inhaler, Benzedrine Sulfate, Benzedrine Solution, Pentnucleotide, Fesol Tablets and Elixir Oxo-rate "B" Eskay's Neuro-Phosphates and Paredrine Hydrobromide with Boric Acid Ophthalmic may be obtained in convenient envelopes from literature dispensers. If additional data are desired, the representative will be glad to answer any questions.

48. E. R. Squibb and Sons, New York City

Physicians are cordially invited to visit the Squibb exhibit. The complete line of Squibb vitamin, glandular, arsenical and biological products and specialties, as well as a number of interesting new items, will be featured.

Well-informed Squibb representatives will be on hand to welcome you and to furnish any information desired on the products displayed.

49. Lederle Laboratories, Incorporated, New York City

Lederle Laboratories Incorporated, will feature a display of its hay fever poison ivy and allergic products together with globulin-modified Lederle antitoxins and selected pharmaceutical products, featuring Vi Delta Emulsion and Vitamin B Complex in both liquid form and capsules.

Samples and literature will be available.

50. American Hospital Supply Corporation, Chicago.

You have heard about Baxter Transfuso-Vacs and Plasma Vacs, which are revolutionizing blood transfusions and blood banking. See them demonstrated in the booth of the American Hospital Supply Corporation.

Among the many other notable specialties on display will be the Tomac Gastro-Evacuator, Junior Oxygenaire, Insufflator and Face Mask, Coli-Bactragen, Sur Masks and so forth. Spend fifteen minutes in the booth to examine these products.

51. Standard X Ray Sales Corporation, Boston.

The Standard X Ray Sales Corporation has good news for the medical profession and cordially invites you to its booth to inspect the remarkable new shock proof ultra full-length fluoroscopic table. This table has been recently developed by the Standard X Ray Company of Chicago, Illinois which is a pioneer in the manufacture of x ray equipment. Incorporated in this table are all desirable features, many of which are not found in other tables. It is entirely new in principle, convenient, and most dependable. It is the table that you have always wanted but could not buy. With this will be shown other equipment of the latest shockproof design.

52. Sandoz Chemical Works, Incorporated, New York City

Physicians will be interested in Gynergen (ergot amine tartrate) for migraine therapy. Newer pharmaceuticals also displayed include: Digiloid, chemically pure, crystallized initial glycosides of *Digitalis lanata*; Calcibronat, a synergistic combination of calcium and bromine; Basergen, a stable preparation of crystalline ergonovine tartrate; Neo-Gynergen, a well-balanced combination of ergotamine and ergonovine for obstetric and gynecological use. Other well-known Sandoz preparations are: Calglucon and Neo-Calglucon, Bellafoline, Belladenal, Bellergal, Scillaren and Quinine Calcium-Sandoz.

53. Abbott Laboratories, North Chicago, Illinois.

You are heartily invited to visit this exhibit of Council-accepted preparations. The Abbott-trained representatives in attendance will be glad to discuss the newer products with you.

Be sure to drop in and register!

54. Sharp and Dohme, Incorporated, Philadelphia.

The new modern display of Sharp and Dohme will feature Propadrine Hydrochloride products, Lyovac Bee Venom Solution and other Lyovac biologicals. There will also be on display a group of new pharmaceutical specialties and biologicals prepared by this house, such as Rabellon, Daldin, Padrophyl, Elixir Propadrine Hydrochloride, Riona Depropanex and Ribothron. Capable, well-informed representatives

- will be on hand to welcome physicians and furnish information on Sharp and Dohme products
- 55 Nestle's Milk Products, Incorporated, New York City
Nestle's Milk Products, Incorporated, makers of milk products and infant dietary materials for more than fifty years, will feature Lactogen in their exhibit. Physicians interested in infant feeding are cordially invited to visit the Nestle booth.
- 56 Cambridge Instrument Company, Incorporated
Cambridge Instrument Company, Incorporated, pioneer manufacturers of the electrocardiograph, is showing its Hindle electrocardiographs and stethographs. Particular attention is given to the Simpli-Trol portable electrocardiograph and stethograph, the precision instrument which weighs only 33 pounds. The exhibit will be chiefly of interest to heart specialists.
- 57-58 Pet Milk Company, St. Louis, Missouri
An actual working model of a milk-condensing plant in miniature will be exhibited by the Pet Milk Company. This exhibit offers an opportunity to obtain information about the production of Irradiated Pet Milk and its uses in infant feeding and general dietary practice. Miniature Pet Milk cans will be given to each physician who visits the Pet Milk booth.
- 59 Kellogg Company, Battle Creek, Michigan.
The Kellogg Company is exhibiting various ready-to-eat cereals. Pep 30 Per Cent Bran Flakes are now fortified with vitamins B₁ and D. An interesting display of foods containing vitamin B₁ will be displayed. Complete information concerning the manufacture and food value of all Kellogg cereals is available, together with vitamin and calorie charts.
- 60 The Coca-Cola Company, Atlanta, Georgia.
Coca-Cola will be served with the compliments of The Coca Cola Company.
- 61 Chr. Hansen's Laboratory, Incorporated, Little Falls, New York.
This is The Junket Folks' booth, with a graduate dietitian in attendance. Free servings of rennet-custards made with Junket Rennet Powder and Junket Rennet Tablets will be furnished. Authoritative literature describes the action of the rennet enzyme on milk and the place of rennet-custards in the diets of convalescents, postoperative patients, invalids, infants, children and so forth. There will be a display of Junket Brand food products.
- 62 Cameron Surgical Specialty Company, Chicago
See the new Cameron Color-Flash Clinical Camera, the Projectoray and the latest Cameron Lempert Headlite demonstrated in the booth of the Cameron Surgical Specialty Company. Latest developments in electrically lighted diagnostic and operating instruments for all parts of the body will be shown. Of special interest will be the new inexpensive office model Radio Knife and other electrosurgical units for cutting, coagulating, desiccating and fulgurating in all sizes from the office model up to the hospital unit with sufficient power for major surgery and transurethral prostatic resections.
- 63 Lee DeForest Laboratories, Boston.
Lee DeForest Laboratories are exhibiting short-wave apparatus available for electrosurgery, hyperpyrexia and all general therapy work. In the same booth will be demonstrated Marvel Portex shockproof x-ray apparatus.
- 64 H. J. Heinz Company, Pittsburgh.
Physicians interested in prescribing for feeding problems—especially in infants, older children or adults requiring soft diets—will be interested in the new Heinz exhibit where Strained and Junior Foods are attractively displayed. Mr. A. J. McGarry is in attendance and will be happy to supply information on these foods.
The eighth edition of the popular Heinz Nutritional Charts, containing greatly expanded charts and new data on the vitamin content of foods, is ready and will be mailed on request.
- 72 Massachusetts State Pharmaceutical Association, Incorporated, Boston.
The Massachusetts State Pharmaceutical Association, Incorporated, will show a model prescription working bench, which has been loaned to it through the courtesy of the Massachusetts College of Pharmacy. It will also display several little known U.S.P. and N.F. pharmaceutical preparations attractively packaged.

LADIES' PROGRAM

A very interesting program for the ladies of the members' families has been arranged for this year by the Ladies' Committee, consisting of Mrs. Walter G. Phippen, chairman, Mrs. J. Frank Donaldson, Mrs. Thomas H. Lanman, Mrs. Roger I. Lee, Mrs. Charles C. Lund, Mrs. F. W. Marlow, Jr., Mrs. Donald Munro, Mrs. Edward L. Pearson and Mrs. W. B. Robbins.

The ladies' registration desk will be in the main lobby of the Copley-Plaza.

TUESDAY, MAY 21

Registration, Copley-Plaza Hotel. Drive to Gore Place, Main Street, Waltham (admission 25c) and to Mrs. Arthur Lyman's garden, Lyman Street, Waltham, buses leave Copley-Plaza Hotel at 2:00 p.m.

Dinner at Horticultural Hall at 7 p.m. to meet Mrs. Phippen and the wives of the district presidents (dinner \$1.50). Buses leave Copley-Plaza Hotel at 6:30 p.m. Dress optional.

"Pop" Concert at Symphony Hall at 8:30 p.m. (tickets \$1.00). The "Pop" Concerts are given by members of the Boston Symphony Orchestra. Messrs. Frey and Braggiotti will play.

WEDNESDAY, MAY 22

Registration. Trip to Salem from 9:30 a.m. to 3:00 p.m. Buses leave Copley-Plaza Hotel at 9:30 a.m. Peabody Museum, Essex Institute, Pingree House and a Salem garden will be visited before luncheon at the Salem Country Club at 1:30 p.m. (luncheon \$1.00). There will be no charge for transportation either day.

Those ladies who wish may play golf on Wednesday afternoon at the Salem Country Club. The greens fee will be \$1.75, and Mrs. Edward L. Pearson will be at the

job to help those who wish to play. All ladies who remain in Salem to play golf must provide their own transportation home, as the buses carrying the ladies party will return to Boston soon after luncheon.

ANNUAL GOLF TOURNAMENT

The annual golf tournament of the Massachusetts Medical Society will be held at the Belmont Country Club on the afternoon of Tuesday May 21.

The Burrage Bowl, emblematic of the Society championship, will again be in competition. The two names already engraved on this trophy are those of Dr. Roy E. Mahrey (1938) and Dr. H. H. Serunian (1939). Numerous other prizes will be offered for both net and gross scores.

Play will commence at 1:00 p.m. and the greens fee for eighteen holes will be \$2.00. If two or more rounds are played during the afternoon the fee will be \$2.50. State handicaps will be used.

Luncheon may be had at the club at 75 cents, and all the privileges of the club will be open to the members of the Society who enter the tournament. Dr. W. T. Halloran, of the Committee of Arrangements has direct charge of the tournament.

MASSACHUSETTS MEDICO-LEGAL SOCIETY

There will be a meeting of the Massachusetts Medical Society in the State Dining Room at the Copley Plaza Hotel on Tuesday afternoon May 21, at 2:30.

TUFTS COLLEGE MEDICAL SCHOOL ALUMNI ASSOCIATION

There will be a luncheon of the Tufts College Medical School Alumni Association at the time of the Massachusetts Medical Society's Annual Meeting on Tuesday May 21 at 12:30 p.m. All alumni and friends are invited to attend.

MISCELLANY

ANNUAL PRIZE SUBSCRIPTION

The annual prize subscription offered by the *New England Journal of Medicine* for the best undergraduate contribution to the *Tufts Medical Journal* has been awarded to Herbert R. Glodt 41 for his paper "The Diabetic as a Surgical Problem" which will appear in the forthcoming issue of the *Tufts Medical Journal*.

NOTE

The annual meeting of the New England Society of Psychiatry was held at the Danvers State Hospital Thursday April 25. Dr. Roy D. Halloran, superintendent of the Metropolitan State Hospital Waltham, Massachusetts, was elected president for the ensuing year. Other officers elected at that meeting were as follows: vice-president, Dr. George E. McPherson, superintendent of the Belcher town State School, Belchertown, Massachusetts; secretary-treasurer, Dr. Bardwell H. Flower, counselors, Dr. Charles H. Dolloff, New Hampshire State Hospital Concord, New Hampshire, and Dr. George A. Elliott, Connecticut State Hospital Middletown, Connecticut. At this meeting the society learned with sorrow of the death of its oldest living past president, Dr. G. Alder Blumer of Providence, Rhode Island.

CORRESPONDENCE

CONNECTICUT COUNTY HEALTH OFFICERS

To the Editor: I just read the editorial on page 601 of the April 4 issue of the *Journal* on turning over to page 602, the first sentence reads as follows: "This committee did however uncover a law in Connecticut that requires that county health officers be lawyers!" I presume the report itself went into detail in regard to the duties of the Connecticut county health officer when that law existed. The Connecticut County Health Officer Law was repealed in 1939 and the duties of the county health officer have been taken over by the local prosecutor, the town board of selectmen and the State Department of Health.

Your editorial gave readers the idea that the county health officer of Connecticut, a lawyer was doing general public-health work. Such was not the case. May I refer you to copies of Section 2402 and Section 2403 of the 1930 General Statutes of Connecticut, which as I mentioned above, were repealed in 1939. The statutes, when the law existed, provided that the county health officer should cause the execution of laws relating to public health nuisances, dangers to public health, and vital statistics and should co-operate with and supervise the activities of town, city and borough health officers and boards of health within each county. The county health officer had all the powers of a grand juror and all the powers of a prosecuting officer of each city, borough, town or police court for violations of public-health and vital statistics laws and for violation of by-laws or ordinances relating to public health, contagious diseases, the practice of medicine and midwifery, the sale of poisons and the sanitary code. The county health officer appointed town health officers and approved their bills, which, once approved, the town paid. Thus, the county health officer supervised the doings of the town, city and borough health officers who the statute directed should be some discreet person learned in medicine and sanitary science.

The county health officer was first authorized in 1893 and continued until June 30, 1939 and did much to enforce the health officers' orders, rules, regulations and doings in the towns and cities of Connecticut.

STANLEY H. OSBORN, Commissioner

State of Connecticut Department of Health
Hartford, Connecticut

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

To the Editor: In addition to the articles enumerated in our letter of March 2 the following have been accepted:

The Drug Products Company

Hyposols Dextrose 10 gm. (buffered) 20 cc.
Hyposols Dextrose 25 gm. (buffered) 50 cc.

Mallinckrodt Chemical Works

Urea Pure Crystals—Mallinckrodt

Maltbie Chemical Company

Ampules Sodium Cacodylate—Maltbie 0.1 gm.
(1½ gr.) 1 cc.
Ampules Sodium Cacodylate—Maltbie 0.2 gm.
(3 gr.) 1 cc.
Ampules Sodium Cacodylate—Maltbie 0.25 gm.
(5 gr.) 1 cc.

Ampules Sodium Cacodylate—Maltbie 0.5 gm (7½ gr), 5 cc.

Ampules Sodium Cacodylate—Maltbie 1.0 gm (15½ gr), 5 cc.

Merck and Company, Inc.

Sulfapyridine Sodium Monohydrate—Merck

Parke, Davis and Company

Kap seals Theclol, 0.24 mg

Sandoz Chemical Works, Inc.

Digilanid

Tablets Digilanid, 0.33 mg (1 cat unit)

Digilanid Liquid, 0.33 mg per cc (1 cat unit)

E. R. Squibb and Sons

Sulfapyridine—Squibb

Capsules Sulfapyridine—Squibb 0.25 gm (3¾ gr)

Tablets Sulfapyridine—Squibb 0.5 gm (7½ gr)

The Upjohn Company

Ampules Bismuth Subsalicylate with Chlorobutanol in Oil, 1 cc.

Bismuth Subsalicylate with Chlorobutanol in Oil, 30 cc. vials

Frederick Stearns and Company

Stearns Cod Liver Oil

Winthrop Chemical Company, Inc.

Ampules Pontocaine Hydrochloride "Niphanoid," for spinal anesthesia, 10 mg

Ampules Pontocaine Hydrochloride "Niphanoid," for spinal anesthesia, 20 mg

The following product has been accepted for inclusion in the list of articles and brands accepted by the Council but not described in N.N.R. (*New and Nonofficial Remedies*, 1939, p 528)

Num Specialty Company
Thum

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,
Chicago, Illinois

REPORTS OF MEETINGS

BOSTON CITY HOSPITAL

At the Boston City Hospital on January 29, Dr Otto J Hermann introduced Dr Roger Anderson of Seattle, Washington, who spoke on "Delayed Union and Non-Union Ninety per cent preventable." In elucidating the statement that proper reduction and immobilization are the fundamental prerequisites for this prevention, the speaker emphasized that in regard to immobilization this means sustained apposition of the fragments throughout convalescence as well as during the early course of healing. He stated that traction, whether skin, bone or Russell, really varies considerably with the changes in countertraction entailed in the change of position of the patient for such necessary maneuvers as feeding and defecation. Dr Anderson contended that such allegedly inconsequential and temporary movements of the fragments contribute to delay if not prevention of union in fractures.

Additional factors in faulty immobilization enumerated include plaster or celluloid spicas for femoral and hu-

meral fractures. With the former, motion is allowed by the necessary arrangements for the toilet, while the latter must permit room for respiration. Dr Anderson also cited tapering casts for the lower leg and hanging cast for the humerus as examples of poor external method of maintaining proper apposition of broken bones. Fixation by open operation is seldom indicated because of in addition to already existing vascular trauma and for its possible inefficiency in many cases. An unusual type of distraction is that caused by an intact fibula in the presence of a fractured tibia. Dr Anderson suggested its treatment by making an oblique fracture of the fibula and overcorrecting the tendency for a varus deformity. Potentially the worst form of distraction, it was stated, is that brought about by the double pin in the presence of absorption of the ends of the bone fragments.

Among causes of faulty reduction Dr Anderson included "continuous" traction, needless operative interference, failure to achieve proper apposition consequent to incomplete roentgenograms, and later absorption at the ends of the fragments with subsequent distraction.

Recommendations advanced by the speaker were based on his theory of controlling the proximal fragment of fractured shafts of long bones rather than attempting to devise bizarre positions for bringing the peripheral fragment into line. His fundamental principle is the use of intimate skeletal transfixion for countertraction. This was referred to as a functional method of immobilization. Reduction may be accomplished by any established method but should be checked both by fluoroscope and roentgenograms in various planes before plaster is applied. Two half pins, which have been originally placed at about a 45° angle to each other at the end of each fragment, are then incorporated in plaster or a special bar. The obliquity of the pins prevents lateral motion.

Regarding the technic of inserting the pins, Dr Anderson stated that it is wiser to use long rather than short ones in order to ensure their protrusion through the opposite side of the shaft. He expressed the belief that timidity on the part of the operator has no foundation in fact and that failure to traverse the bone is one cause of faulty immobilization by this method. Another suggestion offered was that the pins should always be placed as near the joints as possible, so that they will be in vascular bone rather than the gas-pipe shaft.

Dr Anderson has used this method of fixation in all types of fractures of the shafts of long bones, including those near the joints and pathologic fractures. Contrary to the usual concept that both the joint above and below the fracture site should be immobilized, Dr Anderson's method allows practically unlimited motion of surrounding joints. Plaster casts extend only to the adjacent joint, and the patients are encouraged to exercise the uninvolved parts of a limb freely. This was believed to be beneficial not only in preventing troublesome ankylosis but also in promoting the circulation to the fractured bone. The possibility of having patients ambulatory also increases their appetite and improves all bodily function, while their ability to return home relieves an economic burden and allows them to assume a more normal existence.

One of the most important features of the method is the gradual diminution of the distance between the opposite pins, which keeps the fragments in apposition. Dr Anderson is certain that absorption is fairly common and that even in its absence by x ray such a procedure is advisable. This is accomplished by removing a circular strip of cast and then reapplying plaster in the new position. When the Anderson bar is used, the same end may be gained by adjustable screws.

Dr Anderson cited the usefulness of such a method during the exigencies of war when time, men and hospital beds are at a premium. Indeed it was suggested that even in civilian practice only one man need scrub. The bar would be particularly useful in war injuries complicated by sepsis, for arrangements can be easily made for dressings, and bars can be shaped for any type of wound or dressing.

In conclusion Dr Anderson stated that the increase of non-union at the expense of mal-union is a result of the new era of surgical and traction methods of treating fractures. In summing up the advantages of his method of controlling the upper segment he stated that it had not only those mentioned in regard to the doctor and patient but also the additional merit of decreasing the interest in socialized medicine as a result of the decreased hospitalization and loss of work. He emphasized, however, that the method demands accurate knowledge of the apparatus, which improperly managed is probably the most potent source of distraction yet devised.

The discussion, which followed the showing of motion pictures depicting the early return to function in Dr Anderson's cases, was inaugurated by Dr Buckley of Brockton who demonstrated several patients successfully treated by this method. Dr Buckley and later Dr Sever reiterated Dr Anderson's warning of the dangers entailed in the procedure when used by uninformed or inexperienced operators.

Dr Anderson was then asked to answer several questions. He said that he regards sepsis as only a rare complication usually occurring in mishandled cases later referred to the clinic. The danger of interposition of soft tissue is avoided by unlocking all such predisposing fractures by rotation before reduction is performed. The chances of infection were found to be proportional to the number of assistants to the distance of the pins from the vascular bone toward the shaft, and to the failure of the pins completely to traverse the bone due to their shortness. It was stated, however that drainage may persist, particularly in the dense poorly vascularized portion of the bone, as a result of aseptic irritation. Removal of the sequestrum quickly ends the discharge, if it does not do so spontaneously. In wounds complicated by gas-bacillus infection, one waits until the infection has subsided before instituting treatment of the fracture by the Anderson method. But in compound fractures fixation is carried out immediately. The system has been found satisfactory in the management of pathologic fractures, including those occurring in Paget's disease.

Dr Anderson reminded his audience that aftercare is as important with this type of treatment as elsewhere. Fractured femurs should be protected for three to six months, for instance, but many patients can carry on their jobs capably during this time.

Dr Shortell lauded the surprising amount of motion of the adjacent joints secured by Dr Anderson's method but questioned on the basis of local statistics, the high incidence of non-union cited. Dr Anderson, in reply pointed out that his aim was not solely to prevent non-union but also to decrease the amount of delayed union, which is an important consideration, particularly for laboring people.

Marie, was that of a thirteen-year-old girl who complained of hemoptysis and pain in the right chest for three weeks. Physical examination revealed signs consistent with atelectasis of the right upper lobe and this was confirmed by roentgenograms. Bronchoscopy was carried out and demonstrated a smooth 6-mm. mass in the right upper-lobe bronchus, which was diagnosed pathologically as fibrosarcoma. The second case was presented by Dr Magnus I Smedal, of Boston. A sixty-two-year-old man first had a chief complaint of abdominal distress, occasional vomiting and some dysphagia. For thirty years he had had "dyspepsia" and five years prior to admission he had been placed on a Sippy regimen following a bout of pain and hematemesis. Three months before admission an x-ray diagnosis of obstructing duodenal ulcer and gallstones was made, and large areas of calcification were noted in the lower abdominal cavity. An operation was performed for removal of the stones and the freeing of adhesions, but all the symptoms returned within a few days. Seven months later a gastrointestinal series revealed a questionable postoperative defect in the duodenum and the same areas of calcification were noted in the lower abdomen. At operation 210 cm. of ileum was removed for chronic inflammation the areas of calcification proved to be large laminated gallstones within the ileum. The case was considered an example of chronic intestinal obstruction due to liberation of stones into the gastrointestinal tract following rupture of the gallbladder five years before. The final case, presented by Dr Leslie K. Sycamore, of Hanover New Hampshire, was that of a twenty-six year-old horseman who entered the hospital unconscious and cyanotic following an accident. He regained consciousness in three days, but pain in the chest persisted for two weeks. There were occasional hemoptyses and persistent cough and dyspnea but the patient left the hospital against advice in one month. Pain recurred after two weeks, and there was increasing dyspnea until readmission after three months. Roentgenograms revealed atelectasis of the left lung which Lipiodol demonstrated to be due to obstruction of the left main bronchus. A provisional diagnosis of fractured bronchus was made and was confirmed by bronchoscopy. Treatment with pneumothorax afforded the patient some relief. Dr Sycamore stated that although such injuries are usually caused by crushing accidents and are fatal they occasionally have been reported without signs of external fractures. There have been only 6 reported recoveries.

The first paper of the evening was by Dr William J Elliott, of Worcester on "The Non-Medical Use of Roentgen Rays." The speaker cited several practical industrial roles of the roentgen ray. The presence of gas inclusions and internal stress were readily demonstrated in metals, and knowledge of diffraction patterns has been useful in chemical analysis. Fluoroscopy is valuable to large food concerns in the detection of opaque foreign bodies in packages and canned goods. One of the most useful roles of the roentgen ray is in the detection of fraudulent art works, Dr Elliott stated. Infra red rays are an indispensable adjunct in determining minor surface repairs while roentgen rays reveal the characteristic brush stroke so clearly as to allow spurious paintings to be detected and the true source of anonymous works to be discovered.

The final paper of the evening was delivered by Dr Francis T Hunter of Boston, on "Archaeology and Roentgenology." Interesting slides depicted how science in the form of roentgen rays had allowed archaeologists to compare the efficacy of various methods of preparing mummies. The determination of the state of preservation of the body as well as the detection of unusual inclusions within the mummy case, aided the research materially.

NEW ENGLAND ROENTGEN RAY SOCIETY

A regular meeting of the New England Roentgen Ray Society was held at the Boston Medical Library on February 16 with Dr Langdon T. Thaxter presiding.

There were three short case presentations. The first case, presented by Dr Roland D. Clapp of Lewiston

NOTICES

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, May 15, from 2 to 4 p.m. Drs. John Homans and E. A. Stead will speak on "Edema."

Physicians and students are cordially invited to attend

BOSTON ORTHOPEDIC CLUB

There will be a meeting of the Boston Orthopedic Club at John Ware Hall of the Boston Medical Library on Monday, May 13, at 8 00 p.m. Dr. Henry Graham will present a paper on "An Efficient Method for the Reduction and Immobilization of Colles' Fractures"

BOYLSTON MEDICAL SOCIETY

There will be a meeting of the Boylston Medical Society in Amphitheater C of the Harvard Medical School on Monday, May 13, at 5 00 p.m. Professor C. H. Best, of the University of Toronto, will speak on "Factors Influencing the Production and Liberation of Insulin from the Pancreas"

NEW ENGLAND PEDIATRIC SOCIETY

The next meeting of the New England Pediatric Society will take place on Wednesday, May 15. The clinical presentation will be held at the Massachusetts General Hospital, and all the other events at Longwood Towers, Brookline.

PROGRAM

- 4 00 Clinical presentation by staff at Massachusetts General Hospital.
- 6 15 Refreshments
- 7 00 Dinner
- 8 15 Symposium on Adolescence.

Psychological Disturbances and Adjustments of Adolescence. Dr. James S. Plant, Newark, New Jersey

Scholastic Difficulties of Adolescence. Mr. C. E. Allen.

Disturbances of Menstruation and Ovulation of Adolescence. Dr. John Rock.

Physicians are cordially invited to attend the clinical meeting and the symposium.

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The annual meeting of the New England Society of Physical Medicine will be held on Wednesday evening, May 15, at the Ring Sanatorium and Hospital, 163 Hillside Avenue, Arlington Heights, Massachusetts.

The council will meet at 6 00, and dinner will be held in the main dining room of the sanatorium at 6 30. At 8 00 Dr. Robert S. Harris will speak on the subject, "Some Nutritional Researches." Dr. Francis L. Burnett will open the discussion.

All members of the medical profession are cordially invited to attend the scientific program

AMERICAN MEDICAL GOLFING ASSOCIATION

The American Medical Golfing Association's twenty-sixth annual tournament will be held at the Winged Foot Golf Club, Mamaroneck, New York, Monday, June 10

Winged Foot has two famous championship courses and a beautiful clubhouse

Some 250, out of the 1360 members of the association, are expected to take part in the thirty-six hole competition. Each contestant will play both courses. The hours for teeing off are from 7 00 a.m. to 2 00 p.m. The sixty prizes in the nine events will be distributed after the banquet at the clubhouse at 7 00 p.m.

All male members of the American Medical Association are eligible and cordially invited to become members of the association, and applications should be obtained from the executive secretary, Bill Burns, 2020 Olds Tower, Lansing, Michigan. Each participant in the tournament is required to present a card with his home-club handicap, signed by the club secretary, at the first tee on the day of play, no handicap over 30 is allowed. Only active members of the association may compete for prizes. No trophy is awarded to a member who is absent from the annual dinner, which is always worth while waiting for!

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, MAY 12

MONDAY MAY 13

5 p.m. Factors Influencing the Production and Liberation of Insulin from the Pancreas. Professor C. H. Best. Boylston Medical Society Amphitheater C Harvard Medical School

8 p.m. An Efficient Method for the Reduction and Immobilization of Colles Fractures. Dr. Henry Graham. Boston Orthopedic Club. Boston Medical Library, 8 Fenway, Boston

TUESDAY, MAY 14

*9-10 a.m. Studies in Urobilinogen Metabolism. Drs. Karl Singer and Edward B. Miller. Joseph H. Pratt Diagnostic Hospital.

*12 m. Emergencies in Medical Practice. Dr. William B. Brind. South End Medical Club. Boston Tuberculosis Association, 534 Columbus Avenue, Boston

*8 15 p.m. Important Factors in Development as Revealed by Early Stages of the Macaque Embryo. Dr. George L. Streeter. Journal Club. Boston Lylog in Hospital

WEDNESDAY MAY 15

*9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*2-4 p.m. Edema. Drs. John Homans and E. A. Stead. Peter Bent Brigham Hospital

*4 and 8 15 p.m. New England Pediatric Society. Massachusetts General Hospital and Longwood Towers, Brookline.

THURSDAY MAY 16

*9-10 a.m. Huntington's Chorea. Dr. A. Warren Stearns. Joseph H. Pratt Diagnostic Hospital

FRIDAY MAY 17

*9-10 a.m. Obesity. Dr. Mark Falcon Lesser. Joseph H. Pratt Diagnostic Hospital

SATURDAY MAY 18

*9-10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital

*Open to the medical profession

MAY 10—Association of Military Surgeons. Page 781 issue of May 2.
MAY 10-18—American Scientific Congress. Page 1043 issue of December 28.

MAY 13—United States Pharmacopoeial Convention. Page 202, issue of February 1.

MAY 15—New England Society of Physical Medicine. Notice above.

MAY 20—South Boston Medical Society. Page 781 issue of May 2.

MAY 21—St. Francis Hospital (Hartford) alumni. Page 737 issue of April 25.

MAY 21-22—Massachusetts Medical Society Annual Meeting. Copcity Plaza Hotel Boston

JUNE 4-6—National Gastroenterological Association. Page 737 issue of April 25.

JUNE 4-7—American Association of Industrial Physicians and Surgeons. Page 654 issue of April 11.

JUNE 7-8—American Heart Association. Page 469 issue of March 14.

JUNE 7-10—American Board of Obstetrics and Gynecology. Page 64, issue of April 4.

- June 8 and 10—American Board of Ophthalmology. Page 719. Issue November 2.
 June 8-10—America College of Chest Physicians. Page 81. Issue of 7/2.
 June 10—American Medical Golfing Association. Page 824.
 June 10-14—American Medical Association. Annual meeting. New York 7.
 June 10-14—American Phys. & Nat. Assn. Page 332. Issue of May 22.
 June 12—Harvard Medical Alumni Association. Page 781. Issue of May 2.
 June 23-25—Maine Medical Association. A. ual meet g. Bangor 7.
 June 27—Pentucket Association of Physicians.
 October 8-11—American Public Health Association. Page 653. Issue April 11.
 October 21—American Board of Internal Medicine Inc. Page 369. Issue of February 29.

DISTRICT MEDICAL SOCIETIES

DOLESEX EAST

Mar 15, at 12:15 p.m. at the Unknown Country Club, Stoneham

DOLESEX NORTH

Mar 31

October 30,

TYMOUTH

Mar 16—Lakeville State Sanatorium, Middleboro.

BOOK REVIEWS

Minor Mental Maladjustments in Normal People Based on original autobiographies of personality maladjustments J. E. Wallace Wallin. 298 pp. Durham North Carolina. Duke University Press, 1939 \$3.00.

This book, based upon autobiographical material obtained from about three hundred of the author's graduate and undergraduate students, is intended for use as source or case book for students of "mental hygiene psychology education, child development, sociology and the formation of personality traits." As might be expected in view of their source the case histories are superficial, objective and largely descriptive at a contemporary level. Taken for what it is, however the material does illustrate a wide range of minor clinical symptoms in normal people—fears, phobias, dreads, anxieties, worries, obsessions, compulsions, dreams, nightmares and feelings of inferiority and inadequacy to name only a few of the topics dealt with. The author in organizing the material has broken up the case histories, using one part to illustrate one set of symptoms in one chapter and another part of the same history to illustrate a different set of symptoms in another chapter. As a result, nowhere in the book does a complete individual biography emerge as an integrated whole. One could scarcely plan a more convincing demonstration than this book provides of the sterility of academic psychology when faced with clinical phenomena judging from his book, the author would seem to have very little familiarity with the teachings of Adolf Meyer and the body of medical knowledge called psychobiology.

Otolaryngology in General Practice Lyman G Richards. 352 pp. New York The Macmillan Co. 1939 \$6.00.

Starting with the premise that in recent years no book has been written especially for the general practitioner, who, either by election or through force of circumstance, has ear nose and throat problems to solve, Dr Richards has contributed a clearly written, neatly arranged and excellently illustrated book that should adequately supply his need.

Each chapter heading, with few exceptions, is a major symptom from which a patient may be seeking relief, and under the symptom are discussed the various possible

pathologic conditions that might cause it, with a description of and proper therapeutic measures for each.

The operative procedures advocated are of the simplest type and clearly described, and are those which experience has demonstrated to be safe and adequate.

Several approved techniques for removal of the tonsils and adenoids are illustrated and due consideration is given to the aftercare and possible complications that sometimes arise during the postoperative period.

The chapter on respiratory obstruction is especially well done and could be read with profit by anyone in the practice of medicine, surgery or pediatrics.

Considering the fact that this book was written by one man, there are surprisingly few statements to which one could take exception and these in no way interfere with its main purpose. Although written specifically for the general practitioner the book should be of value to the student and of interest to the otolaryngologist.

Circulatory Diseases of the Extremities John Homans. 330 pp. New York The Macmillan Co., 1939 \$4.50

The present generation of physicians and laymen has become impatient with chronic disorders, whether they occur in the young or in those who are middle-aged. This has resulted in an enormous amount of work on the diseases of the peripheral circulation and within the past few years a large number of books have appeared on these disorders. Unfortunately these monographs, for the most part, have confined themselves to diseases of either the veins or the arteries and moreover they have usually been dedicated to the espousal of some particular form of therapy.

Dr Homans's book is the first in a long while to attempt a comprehensive survey of the diseases of the arteries, veins and lymphatics of the extremities and it is refreshingly unique in its avoidance of therapeutic prejudice.

The author is well qualified to handle his subject, having a background of many years of fruitful work in this field. He is widely known for his original observations, especially in the realm of the veins and lymphatics. His long experience as a teacher is reflected in the intimate, conversational tone of the book, which makes for particularly pleasant reading. There are innumerable references to cases seen, and even when these are set off as reports, they are interspersed with a running comment on the significance of the points raised. He is not averse to questioning the wisdom of the treatment used in any individual case, and he suggests alternatives that might have been tried in just such a case.

The book opens with a chapter on "Sorting Out the Vascular Disorders of the Limbs, which outlines the normal physiology of the peripheral circulation and includes details of the diagnostic methods used. Arteriosclerosis, thromboangiitis obliterans, arterial embolism and spastic diseases of the arteries are then individually considered. In the treatment of each disease, Dr Homans discusses the hygiene of the limbs, in addition to the medical physiotherapeutic and surgical methods. The important diagnostic and therapeutic procedures are illustrated by clear drawings, and references are given to important sources. An attitude of rational conservatism is quite evident.

In the chapter on varicose veins, emphasis is given to the physiologically conceived division of the veins at strategic points, and the injection of sclerosing solutions is characterized as an aid to this process. Considerable space is devoted to pulmonary embolism as a complication of thrombophlebitis. It is suggested that veins showing a

minimum of reaction are usually the source of such emboli. The author suggests that the large venous trunks be ligated in order to prevent this accident. Postphlebotic ulcerations are treated as peculiarly specific entities. Many disagree with this attitude and contend that the therapeutic results justify the classification of these lesions as varicose ulcers of particular severity.

A concise account of peripheral aneurysms and arteriovenous communications then follows. Finally, the author adds a section on the lymphatic system. His previously reported observations on lymphedema are again presented. He has obtained excellent results in long-standing cases by an excision of the subcutaneous fat and the deep fascia, a modification, in fact, of the Kondoleon operation. Dr. Homans explains the excellent results of this procedure not by the formation of new lymphatic pathways, but rather by the removal of lymph-bearing tissue.

If one is disappointed in not finding an exhaustive treatment of each subject, it should be emphasized that our knowledge of these disorders is in a state of flux. The author has intended to present readily available information for the practitioner and student, and to make the volume one "which will not be quite out of date in five years." This promise seems well fulfilled, and the volume should be owned by all interested in the subject.

Electrocardiographic Patterns Their diagnostic and clinical significance Arlie R. Barnes 197 pp. Springfield, Illinois, and Baltimore Charles C. Thomas, 1939 \$5.00

This book is an important milestone in the history of electrocardiography. As the author points out in the introduction, the electrocardiograph has outgrown its original importance as an instrument in the analysis of cardiac arrhythmias. Its chief value now lies in the information which it is able to give about the unbalanced electrical effects within the heart dependent on alterations of myocardial structure and preponderant effect of unilateral cardiac strain. The author and his associate, Whitten, were pioneers in pointing out these newer concepts and investigating the possibilities of the localization of cardiac infarcts by means of the electrocardiograph.

The first three chapters discuss the anatomy of the coronary arteries and their relation to acute myocardial infarction, and the electrocardiographic findings during the acute and healing stages of cardiac infarction. The next three chapters are concerned with the electrocardiogram in ventricular strain of left or right type. A detailed chapter follows on the changes due to pericarditis, and then one on the effects of certain drugs, metabolic disorders and infections. The final chapter contains observations relative to precordial leads. The literature is covered in all its essential particulars. The illustrations are excellent, and the correlation of the electrocardiographic findings with the autopsy data gives very important information. The method for illustrating the changes in the different leads is very convenient, as the tracings are superimposed on light-shaded diagrams of the normal findings in the same leads.

The text will repay extensive study, and the book serves as a valuable reference in the analysis of difficult electrocardiographic problems. There is one unfortunate situation which the author recognizes, that is, the descriptions and illustrations of the chest lead are those which were used before the Committee for the Standardization of Precordial Leads determined what would be the acceptable formula. As a result, these leads have the reversed polarity to those now in common use, and the reader is forced to make a mental reversal of all the waves and of

their description in the text before they conform to the present practice. This is somewhat confusing even to those who are fairly conversant with electrocardiographic interpretations. In spite of this, it is to be expected that this book will receive the wide distribution which it deserves among serious students of electrocardiography. The approach by electrocardiographic patterns characteristic of certain diseases is a highly practical method and is particularly adaptable to the correlation between electrocardiography and clinical medicine.

The Art of Anaesthesia Paluel J. Flagg Sixth edition, revised 491 pp. Philadelphia, London, and Montreal J. B. Lippincott Co., 1939 \$6.00

This book is a most excellent treatise on inhalation anesthesia, but is rather more limited in its scope than seems implied by the broad term "anesthesia." Concerning inhalation anesthesia the author speaks with authority from his wide and extended experience. Particularly is this true when intratracheal anesthesia is discussed. His position throughout is sound and highly conservative, as he advocates chiefly such well-tried agents as ether, and nitrous oxide and oxygen. It is a distinct loss, however, that such important and widely used methods as spinal anesthesia and intravenous anesthesia are not presented with the same clear and sound discussion. Various minor criticisms could be made, for example, the classification of the signs of anesthesia is somewhat different from that employed by most anesthetists today, and in particular, the conception of an ascending paralysis in deep ether anesthesia seems misleading in that it is distinctly different from the view generally accepted.

While the book covers the field of inhalation anesthesia rather than that of anesthesia, too much praise cannot be given the presentation of what is covered. The pages are packed full with sound advice.

Sterility and Impaired Fertility Pathogenesis, diagnosis and treatment Cedric Lane Roberts, Albert Sharman, Kenneth Walker, and B. P. Wiesner 419 pp. New York Paul B. Hoeber, Inc., 1939 \$5.50

This is an excellent book on the diagnosis and treatment of sterility. The first half is devoted to the male factor in childless marriages, and is a very careful and thorough presentation of the subject. Various chapters take up the constitution of the semen, the assay of male fertility and disturbances in the reproductive mechanism and their treatment, including the endocrine factors.

A similar detailed study is presented of the problem as it appears in women, and here too there is a description of the endocrine balance which is as complete as present-day knowledge allows.

There is an appendix giving laboratory techniques for the examination of semen, the determination of hormones in the urine, the preparation of vaginal smears and so forth. There are a large number of excellent illustrations, and an adequate index.

One might say that the book is somewhat too detailed for the man who is only casually interested in sterility. For those physicians who do considerable work in this field, however, it is a very complete summary of knowledge to date and the price puts it within reach of every body. There are, of course, minor statements with which the reviewer disagrees, but they in no way detract from the general excellence of the book.

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FRACTURES OF THE CARPAL SCAPHOID*

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AMONG the more commonly undiagnosed fractures in our experience are those of the carpal scaphoid (os naviculare). During the last five years 17 cases have been observed by one of us (A.T.) in a college clinic. Particularly is it oote

Colles fracture. At Boulder Dam, drawing from a wider and mostly older age group, Jackle and Clark³ observed 17 such fractures, as compared to 63 fractures of the radius. On the other hand, in a group of men similar in age to our patients



A

B

FIGURE 1 Case C S

Film A taken elsewhere at the time of injury is negative. Film B, taken six months after the injury which had been unreported and untreated, shows a fracture through the proximal third of the carpal scaphoid.

worthy that 11 (65 per cent) were old or previously unrecognized fractures.

The incidence of these fractures is especially high among young men active in sports in which violent hyperextension of the hand takes place. This has long been recognized and has caused the fracture to be called in France *fracture du gymnaste*.¹ Our cases have all occurred in young men between the ages of sixteen and twenty five, and the incidence has been four times that of

but engaged in more extensive gymnastic work. Hopkins⁴ observed 23 cases in twelve years, as against 2 Colles fractures. It thus seems evident that the trauma which in children produces a separation of the radial epiphysis and in adults causes Colles fractures may in the very young adult produce a fractured carpal scaphoid.

The diagnosis of these fractures, under a definite method of clinical and roentgenological examination, should not be overlooked. The standard signs are limitation of motion in extension and radial deviation, and tenderness over the anatomical snuffbox and on the palmar surface over the tubercle of the bone. However, there are oumer-

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ous diagnostic pitfalls, the obvious one being the incorrect diagnosis of sprained wrist. Eleven of our patients failed to receive prompt treatment because their injury had originally been inter-

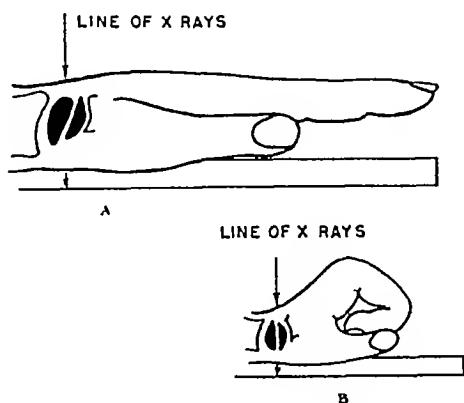


FIGURE 2 *The Optimum Position for Demonstrating by X-Ray a Fracture of the Carpal Scaphoid (Reproduced from American Journal of Surgery [44:101, 1939] by courtesy of the publisher)*

preted as a mild sprain. In 2 cases the youths consulted no one. The initial discomfort was so mild that they did not report their injury, although they were examined daily and not until five

demonstrated in the initial x-ray plates has been mentioned in almost every recent article³⁻⁶ on the subject. In some cases it seems that the central beam of the x-ray fails to coincide with the plane of fracture. Better views may be taken with the fist clenched and the fingers resting on the x-ray plate, with the palm down in extreme ulnar deviation and with extreme pronation (Fig. 2).

If a true fracture is undetected and motion is permitted, absorption of bone occurs along the fracture line, and the fracture becomes more evident in one or two weeks. If the fracture is put rigidly at rest, the process of absorption is arrested and reversed, and union gradually takes place. This is very well illustrated in another of our cases (Fig. 3). In order to rule out all possibility of fracture, it is good judgment to subject every persistently painful wrist to x-ray examination at weekly intervals.

Several classifications of carpal scaphoid fracture have been used in the literature. We prefer the anatomical one. Fractures through the tuberosity are extra-articular and always heal in four to six weeks by bony union—we have treated 1 such case, for the purposes of this discussion, this type of fracture need not be further considered.



FIGURE 3 *Case H E R*

Film A, taken at the time of injury, is negative, film B, taken one month later, shows cystic absorption along the fracture line, film C, taken sixteen weeks after immobilization, shows bony union.

months after the original injury was it reported, when a few symptoms persisted. In 8 cases occurring outside the college the injury was reported to some higher authority (squad trainer, camp doctor or family physician), who incorrectly treated a sprained wrist without taking an x-ray photograph. In 1 case the boy's family physician took an immediate x-ray film, which was negative, yet by the end of six months there had occurred cystic absorption and disintegration into two fragments (Fig. 1).

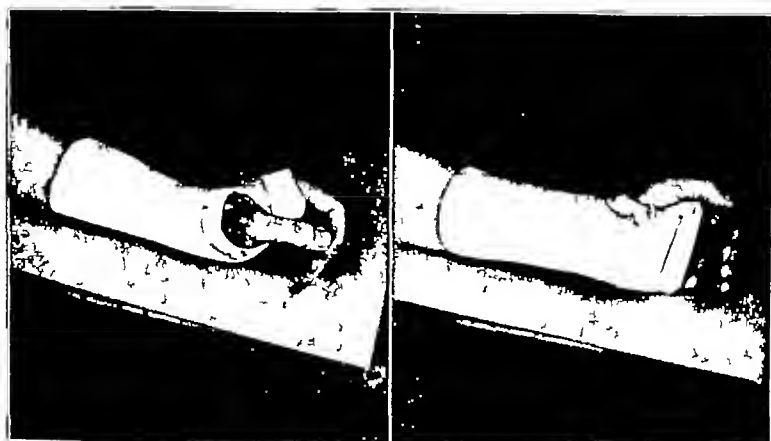
The failure of some of these fractures to be

here. Fractures through the middle and proximal thirds of the body constitute the great majority of injuries. The fresh fractures show little or no displacement. The separation seen later is the result of absorption.

The treatment of acute fractures has been well standardized, and provided that the diagnosis is promptly made and that effective immobilization is instituted and maintained, fractures of the body of the scaphoid unite in a very high percentage of cases. In our series 5 out of 6 such cases (82 per cent) united promptly by bony union, in the

case with non union, the fracture involved the proximal third of the body, and in the cases with union the tuberosity was fractured in 1 and the distal or proximal third of the body in 4 Jackle

of Jackle and Clark² and Hopkins,¹ as well as to our own. There is very definite evidence that the high waist-and-body fractures are not necessarily foreordained to bad results, but that, on the con



A

B

FIGURE 4 The Ideal Type of Cock-Up Splint Using Thermex and Castex as Splinting Materials

and Clark,² with an ideal set up for prompt recognition and early treatment, obtained bony union in 87 per cent of cases. It is certain that early, effective immobilization is the key to good results. Conversely, the motion of five articulating surfaces in frequent movements of the hand is the one

contrary, immobilization gives a high percentage of excellent results.

The optimum anatomical position for immobilization has been carefully worked out by Berlin⁸ in a dissection of 60 wrists, likewise by Soto-Hall and Haldeman.⁹ Uniformly the fragments are

TABLE 1 Data on Cases with Non Union

| CASE | SITE OF FRACTURE | TIME INTERVAL AFTER TRAUMA | PAI | REMARKS |
|----------|---------------------|----------------------------|-------------|---|
| R. G. | Body proximal third | Immediate | None (1 yr) | Law student |
| G. F. | Body middle third | 3 mo | None | Three years army football and hockey |
| J. G. | Body middle third | 4 | None | One year freshman football 1 yr varsity football |
| | Body middle third | 1 | Occasional | |
| R. T. G. | Body middle third | 4 | None | Bone-peg operation; union; postoperative complications 2; army baseball |
| C. C. S. | Body proximal third | 6 | None | Two years junior army football |
| S. K. | Body middle third | 1 | Occasional | One year freshman football; 3; varsity football |
| | Body middle third | 4 | Occasional | |
| R. C. C. | Body proximal third | 19 | None | Not in organized sports |
| J. W. H. | Body middle third | 24 | Occasional | Dental student; catches drumstick while playing drums in orchestra |
| C. H. | Body proximal third | 48 | None | Graduate student |
| R. C. | Body proximal third | 60 | Occasional | Football line coach; considered injury sprain |

certain common cause of absorption along the fracture line and subsequent non-union. We can not agree with the advocates of immediate open operation on fresh fractures. Cravener and McElroy⁷ and Adams and Leonard⁷ base their treatment on the premise that simple immobilization treatment results in a high percentage of non unions. This is contradictory to the experience

best apposed with the wrist in 40 to 50° of extension and slight radial deviation. This position has become a fairly standard one. In order further to splint the scaphoid by cradling it between the flexor and extensor tendons of the thumb, Soto-Hall and Haldeman advocate immobilizing the entire thumb. Using a light unpadded cast, we have obtained union without such immobilization.

This greatly increases the utility of the hand during the necessary period of fixation. An ideal material for the usual cock-up cast is the recently demonstrated Thermex splint¹⁰ covered with a light Castex cylinder.¹¹

In our series, 11 fractures were detected from three months to five years after the initial injury (Table 1). We have had an unusual opportunity to follow these cases of non-union intimately over a period of years, and from close personal discussion to evaluate the degree of their disability. One patient was advised elsewhere to have a bone-pegging operation and obtained with operation a good result and bony union. His convalescence was prolonged by a complicating phlebitis. However, today he has a painless wrist, but with marked limitation of motion. None of the other 10 patients considered their symptoms sufficiently bothersome to warrant operation. In some cases there was slight weakness, slight limitation of extension and, to a lesser degree, limitation of flexion at the wrist. Most of the patients had no pain, and all performed very active work. As we have followed these cases year after year there has been, strikingly, no single instance of significant disability because of non-union.

The results of operative treatment of old non-union cases have been good. The operation consists of multiple drilling (Speed,^{4, 12} Edelstein,⁶ Soto-Hall and Haldeman,⁹ or more commonly of inserting a tiny bone peg (Murray,^{13, 14} Burnett,^{15, 16}) through the anatomical snuffbox. Cave⁵ has reported bony union in 4 (57 per cent) of 7 pegged cases, with all cases rendered free from pain and functionally almost perfect. Burnett¹⁶ reports 5 pegged cases, again with good clinical results: bony union in 2, and fibrous union in 3. Murray^{13, 14} reports 16 cases, all with excellent functional results and all united. Comparable results have been reported with drilling. Bohler¹⁷ and Schneck¹⁸ have been able, by very prolonged immobilization (six months or more), to obtain union in these late cases.

From our observation, then, the disability in cases of non-union is rather insignificant and often negligible, even in periods up to five years after the fracture. Hopkins¹ found all his 23 patients able to work as physical directors. We believe that only those patients with definite disability should be urged to have the open operation of bone pegging or drilling. It would seem today that there is no place for the operation of removing both bony fragments. Occasionally removing the proximal fragments does relieve pain, as Cotton¹⁹ so ably demonstrated.

The cause of non-union is related to the degree of motion allowed, not alone to the poor blood supply of the scaphoid. Johnson²⁰ has shown, in a

careful study of experimental fractures of the carpal scaphoid in dogs, that at least in these animals new blood vessels enter both fragments very rapidly, and via a drill hole especially rapidly. Adams and Leonard⁷ found soft tissue interposed between the fragments in one late case of non-union—the first case to be operated on by inlay graft. Because the fresh fractures have slight if any displacement, we believe that soft-tissue interposition is usually secondary, after absorption has taken place.

SUMMARY

Among 6 acute cases of carpal scaphoid fracture, in a series of 17 cases among men of college age, treated with immediate and prolonged immobilization, 5 united. Rigid immobilization should be carried out for twelve weeks, with an additional four weeks' partial immobilization in a supportive gauntlet.

The position we prefer for immobilization is extreme extension of the wrist, with radial deviation and the thumb exposed.

In 11 old cases, either the patient failed to report the injury or the surgeon who first saw the case overlooked the fracture. In order to avoid this, we suggest that every sprained wrist that does not respond to treatment be x-rayed at weekly intervals.

In 10 out of 12 ununited fractures, the disability was so slight that the patients themselves would not admit the necessity of an operation. Seven of these 10 patients participated actively in football and other strenuous sports.

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CHANGES IN PUBLIC-HEALTH PRACTICE*

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BOSTON

NO ACCURATE history of the world's progress would fail to include a most fascinating chapter devoted to the story of man's conquest of disease. Quietly and unobtrusively, without the blare of the trumpet or the beat of the drum, without the stimulus which comes from the flash of the bayonet or the gleam of the sword, many unsung heroes have sacrificed their lives in quest of knowledge, that disease might be conquered, health protected and life extended. The physician and the nurse at the bedside of the sick and in the clinic, the laboratory technician, the sanitarian and other workers in the field of public health have waged constant battles with man's most persistent enemy disease. In ancient times and throughout the so-called Dark Ages, and up to a comparatively recent period, as we measure the slow progress of time, the army of death marched roughshod, exacting its toll of millions of lives. Smallpox, bubonic plague, cholera, typhus, yellow fever, malaria and other diseases played their part in the mass slaughter of human lives.

The dawn of a better day was ushered in less than one hundred years ago by what has been described so aptly as the "Great Sanitary Awakening," this in essence symbolizing an increasing appreciation of the importance of satisfactory environmental sanitation and the great need for better living and working conditions. Students of public health history appreciate in full measure the epochal contributions of the English sanitarians, Simon and Chadwick, and in a marked degree the vision of Lemuel Shattuck here in Massachusetts. The part played by these men and the influence of their efforts marked the beginning of what we conceive to be the modern public-health movement. Shortly after the Civil War the contributions of the immortal Pasteur, of Koch and of their collaborators, scoffed at in a marked degree by the skeptics of that day, crystallized in the acceptance of the germ theory of disease. Increasing bacteriological knowledge, revealing the causes of certain diseases, became an all important factor in the prevention, control and treatment of illness. The influence of Pasteur and Koch reached across the Atlantic to the United States, where Welsh, Pruden Biggs, Park, Sedgwick, Chapin and some of the founders

of the Massachusetts Association of Boards of Health played a part in the formulation of sound public health principles and in the adoption of accepted public health procedures. To the emphasis on environmental sanitation there was added the effort for the control of the communicable disease.

Here in Massachusetts, in accordance with the recommendation of Lemuel Shattuck, included in his epochal report of 1849, the State Board of Health, the first in America, was founded in 1869. The major efforts of health departments for the following two decades were in the field of sanitation and the furtherance of the control of certain communicable diseases. The year 1890, when this association was founded, marked the beginning of twenty five years of uninterrupted tremendous public health progress in America. Among the many significant contributions of this quarter of a century were an appreciation of the importance of the protection of our water and milk supplies, and the development of the procedures by which this might best be accomplished, the contributions of Walter Reed and his colleagues in furthering the control of insect-borne diseases, the utilization of antitoxin in the treatment of diphtheria, the discovery of the carrier as a cause of disease and a source of the spread of infection, and the realization of the importance of sanatorium care in the treatment of tuberculosis, reflected in the establishment at Rutland by the Massachusetts Department of Public Health of the first sanatorium in America. Progress in infant and child welfare, first emphasized by Budin and his associates in France and by Koplik in New York, resulted in the establishment of the first department of child hygiene by the New York Department of Health in 1908. This was preceded by the establishment of school medical inspection in the Boston Health Department in 1894. Campaigns for clean milk bore fruit and this began to be reflected in a reduction of infant deaths. The contributions of Biggs to varied aspects of health administration, the contribution of Park to laboratory practice under municipal auspices, the furtherance of the principles of immunology—these are but some of the outstanding landmarks of what may be termed the most fruitful years in public health history.

What has been done in the quarter of a cen-

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ture from 1915 to today is a familiar public-health chapter to most of us. In retrospect it is fair to emphasize that public health has, indeed, marched a long way since a hundred years ago, a date that marked the beginning of the first social consciousness of the need of a more wholesome sanitary environment, followed by the application of bacteriological knowledge for the control of communicable diseases, and culminating in the present appreciation of the significance of personal and community health.

In 1921, in commemoration of the celebration of the fiftieth anniversary of the founding of the American Public Health Association, a historical volume was published entitled *One Half Century of Public Health*. The period spanned was from 1871 to 1921. The prevalent public-health programs and practices of 1871 were in essence comparable to those of 1890. I should like, therefore, to refer to a statement appearing in the above-mentioned volume written by Stephen Smith, first president of the American Public Health Association. He calls attention in his article to a reply made by a sanitary health official, or health warden, as he was then called, of New York City, functioning in the period mentioned, who when asked, "What do you do when called to a case of contagious disease?" replied "I go to the house and call the people into the street and give my orders to burn sulphur. I never go into the house."

From this unbelievable, superficial and erroneous concept of disease control, which was the practice of that day, public health has indeed traveled far in its onward march, changing the map

by man in the spread of disease. It was recognized that disease was spread by the pollution of water and milk, by insects, by contact with the sick and by carriers, and out of the acceptance of this knowledge developed the modern health program of today.

I believe it opportune at this time to attempt to relate the evolution of the public-health program during the last fifty years to the improvement in health conditions, reflected by the constant reduction of morbidity and mortality, and I shall take the liberty of presenting some vital statistics from the reports of the Boston Health Department. The figures presented are for the year of 1890 and for every decade thereafter. They present a picture of diminishing morbidity and mortality from preventable causes, and also show an increase of those diseases found in middle and later life, a picture familiar to students of vital statistics, who recognize the principle that as we prevent unnecessary deaths among our young, and deaths from preventable causes in other age groups, we produce a very much larger number of people who live to that period of life in which is found an increase of the diseases of adult, middle and later life. The vital statistics of Boston present a reasonable cross-section of prevalent health and disease conditions in many parts of the United States for the periods enumerated, and the mortality rates from specific causes may be considered as typical, by and large, for the country as a whole.

Particular attention is called to the pleasing figures which reveal the halving of the general death rate during the last half-century (Table 1).

TABLE 1 *Death Rates in Boston over a Period of Fifty Years*

| YEAR | GENERAL MORTALITY* | INFANT MORTALITY* | TUBERCULOSIS | SCARLET FEVER | DIPHTHERIA | TYPHOID FEVER | HEART DISEASE | CANCER | DIABETES |
|------|--------------------|-------------------|--------------|---------------|------------|---------------|---------------|--------|----------|
| 1890 | 22.6 | 169.3 | 332.7 | 9.3 | 102.8 | 41.4 | | | |
| 1900 | 20.8 | 146.3 | 250.6 | 32.2 | 95.6 | 29.4 | 174.8 | 78.2 | 13.5 |
| 1910 | 17.2 | 126.7 | 172.6 | 8.7 | 23.4 | 11.6 | 215.5 | 102.8 | 20.0 |
| 1920 | 15.5 | 100.8 | 109.6 | 9.5 | 18.7 | 1.5 | 199.8 | 129.2 | 23.4 |
| 1930 | 14.1 | 70.2 | 68.5 | 5.0 | 2.9 | 0.8 | 258.4 | 171.0 | 30.0 |
| 1939 | 11.1† | 42.1 | 44.7 | 0.1 | 0.4 | 0.4 | 353.0 | 203.5 | 38.7 |

*Deaths per 1000 population; the balance of the figures are deaths per 100,000 population.
†Corrected for residence.

of the world for the ultimate good of organized society.

When this organization was first founded, the methods for the protection of our water and milk supplies were exceedingly superficial and unsatisfactory, with a consequent high prevalence of water-borne and milk-borne diseases. Laboratory practices were lacking, and terminal fumigation, now discontinued, was very much the practice of that day. With increasing bacteriological knowledge came the realization of the active part played

by man in the spread of disease. It was recognized that disease was spread by the pollution of water and milk, by insects, by contact with the sick and by carriers, and out of the acceptance of this knowledge developed the modern health program of today.

It is pertinent to relate these progressive improvements to the changes in public-health programs, by a presentation of the practices of 1890 and of the decades that followed, as compared

with those of the present day. In 1890, department of health concerned themselves in the main with environmental sanitation, including increasing efforts for the protection of water supplies, sewage and garbage disposal, abatement of nuisances, fumigation, attempts at control of certain communicable diseases, and terminal disinfection following them.

A study of the annual report of the Boston Health Department for 1890 reveals the expenditure of approximately \$88,000, as contrasted with almost \$1,000,000 spent in 1939. One of the very largest items of the expenditure for 1890 was the cost of disinfection and fumigation, with a record of 93,000 disinfections of cellars, cesspools, alleys and privies, and the disinfection of 4300 rooms, following the presence of highly prevalent contagious disease. This report of the Health Department calls attention to the use of 23,424 pounds of sulfur and 2950 pounds of bichloride of mercury and comments on the recognition of disinfection as one of the recognized factors in the prevention and control of disease. This evident emphasis on sanitation was supplemented by efforts for the isolation of infected persons.

While this tremendous amount of disinfection was going on, 333 out of every 100,000 of our population died from tuberculosis, 103 from diphtheria, 41 from typhoid fever and 9 from scarlet fever. Today the Housing and Sanitation Division performs the accepted necessary public health functions of this important branch of the Health Department service. Soap and water, fresh air and sunlight have replaced fumigation with more beneficial results.

What is the comparative picture? In 1939 we had less than 45 deaths for 100,000 inhabitants from tuberculosis, 0.1 from scarlet fever, 0.4 from diphtheria, 0.4 from typhoid fever. In 1890, with a population of 448,000, as contrasted with the present population of about 840,000, there were actually 400 deaths in Boston from diphtheria, as against 1 this year; 41 from scarlet fever as against 1, 155 from typhoid fever as against 1. If the infant death rate prevalent in 1890 were applied to the number of live births in 1939, we should have had 2600 deaths of children under one, as against 650 actually occurring last year.

In 1900, with a population of 650,000 Boston had 553 deaths from diphtheria, 143 from typhoid fever, 181 from scarlet fever and 1400 from tuberculosis, in spite of the disinfection and fumigation of 13,798 rooms, and the use of 55,000 pounds of chloride of lime and over 6800 pounds of other chemicals.

By 1910 the population had grown to 673,000 people. We had 3453 cases of diphtheria, 2079

cases of scarlet fever, 630 cases of typhoid fever and 1163 deaths from tuberculosis, in spite of the disinfection of 11,744 rooms following contagious disease and 12,358 disinfections for other purposes.

In 1920, with a population of over 750,000 in Boston, which was rapidly approaching its present size, we had 1966 infant deaths, 140 from diphtheria, 71 from scarlet fever, 956 from tuberculosis and 141 from typhoid fever.

By 1930 the Health Department had grown in stature and was spending \$1,000,000 for health purposes, the health units, first conceived locally in 1915, were functioning, tuberculosis clinics had been established on a decentralized basis, the nursing service was extended and generalized, and immunization against diphtheria was being carried on in an extensive way. The tuberculosis death rate had dropped to 69, that of diphtheria to 3 and the infant mortality rate to 70. Dental care was being rendered for 56,000 children. A health educator was employed, and other accepted public health activities had been added to the program of the Health Department.

What have been the results of this half-century of public health effort in Boston as in many other communities where reasonably adequate funds have been provided and expended for the conduct of those activities which prevent disease and conserve health? As already mentioned, the span of life has been materially lengthened, the death rates from all causes have been almost halved, the infant mortality rate reduced by 75 per cent, that of tuberculosis by 89 per cent, and diphtheria and typhoid almost eliminated as a cause of death in our community, while deaths from scarlet fever have become negligible.

What have been the changing practices that have brought about this remarkable improvement? Hermann M. Biggs, to whom we owe a great deal for the furtherance of administrative technique in the field of public health administration, proclaimed that public health was purchasable, and that within reasonable limitations communities might determine their own death rates. What did he mean by that? He meant in substance that the wise expenditure of adequate funds for the conduct of essential public health activities would markedly control the prevalence of preventable diseases and deaths from many causes. What are these activities that he had in mind, and what part have they played in influencing the health of the American people? Allusion has already been made to the significant effect of the application of sound procedures for the sanitation of the environment, the protection of our water and milk supplies and the control of communicable diseases. The place

of the laboratory as a significant component part of a modern health department has been amply demonstrated. The significance of immunological agents has been demonstrated beyond measure as a factor in the prevention of disease.

Very fortunately for organized society, this century has been marked by a number of significant public-health movements which have required the participation of the individual. The child-hygiene movement, the campaign for the control of tuberculosis, the mental-hygiene movement and the social-hygiene movement, waged by official and voluntary agencies, have stimulated the imagination of the American people, and have resulted in higher standards of individual and community health. Clinics of various types, carrying on the functions in the above-mentioned fields and having for their objectives the prevention and control of disease, have become increasingly utilized by armies of people, who have demonstrated by their reaction that they truly believe that an ounce of prevention is worth a pound of cure.

The progress in the field of child health has justified the frequently expressed belief that we are living "in the century of the child." Allusion has already been made to the effort in France for infant welfare and of the work in New York City on infant feeding by Koplik, who in the late eighties and early nineties stressed the significance and importance of breast feeding and clean milk. There developed at the beginning of this century increasing interest and programs for the conservation of the lives of our young children, in so marked a degree that we now proclaim the infant mortality rate to be an index of a community's intelligence. This implication is based on the premise that we may safeguard the lives of our children and prevent unnecessary deaths among the young by the development and maintenance of adequate programs for the conservation of child life.

It is important to call attention to the significant relation between satisfactory prenatal care and maternal and infant welfare. Studies carried on in Boston, in Philadelphia and by the Maternity Association of New York have proved that the death rate among expectant mothers receiving adequate prenatal care was about half that among those lacking such medical supervision. A study of 1000 maternal deaths, conducted by Dr. Susan Coffin for the Massachusetts Department of Public Health, revealed the absence of adequate prenatal care among 890 of these expectant mothers. Today in every intelligent community reasonably adequate services exist for prenatal care, either in the offices of the medical profession or obstetrician

or in organized clinics under the auspices of the health department or private agencies. Prenatal care has done much to reduce the hazards of the toxemias of pregnancy, injuries at birth and prematurities, and to lower deaths among infants. There is, however, much room for further improvement in deaths occurring during the first month of life.

Both voluntary and official agencies have concerned themselves with the problem of infant, preschool and school-child health. Milk stations and baby and preschool clinics have served as the headquarters for the dissemination of information, and for the education of mothers as to the very best methods for keeping well children well. Among the administrative methods for the conduct of this work has been a co-operative plan developed in Boston between the Health Department and the Harvard, Tufts and Boston University medical schools, whereby pediatricians from the teaching staffs man the clinics and are reimbursed by the Health Department. Advantage is taken of the presentable opportunity for teaching medical students preventive pediatrics. It is in the fields of child health and tuberculosis that the public-health nurse has made a lasting contribution.

Newborn babies are visited shortly after birth by nurses of the Health Department, and mothers are urged to take their babies either to their own family doctor or to the organized clinic for periodic medical supervision. Here children are examined, vaccinated against smallpox and immunized against diphtheria. Breast feeding is stressed, and wherever possible the use of pasteurized milk and the preparation of the proper formula are taught. When children arrive at the preschool age, the so-called neglected age, every effort is made to maintain the continued interest of parents in the physical and mental health of the child. There is, however, room for much further progress among this age group.

We are familiar with the frequency with which we find faulty teeth, defective vision, defective hearing, malnutrition, faulty posture, functional or organic heart disease and occasionally tuberculosis among our school-child population. Large sums are being spent in the United States for the medical inspection of schools and physical examinations for the discovery of remediable defects. Emphasis should be placed on the importance of increasing our efforts in the direction for the correction of defects found. An example of excellent service in this field is the program carried on by Dr. James Keenan, his school physicians and nurses, in the Boston public schools, while the Health Department assumes the responsibility

for medical inspection in the parochial schools

The care of the mouth and primary teeth is receiving fitting recognition. The Forsyth Dental Infirmary in Boston, the Eastman Clinic in Rochester, New York, and the Guggenheim Clinic in New York City are outstanding examples of endowed institutions concerning themselves with prophylactic dental care. It is hoped that what is being done for children today in the way of preventive dental care may bring about higher standards of dental health for the American people. An outstanding example of municipal interest in this field is the program of the Boston Health Department, whereby a corps of approximately twenty dentists and ten hygienists of the Forsyth Dental Infirmary carry on prophylactic dental service in the health units maintained by the city. This personnel is reimbursed from tax funds.

Attention is being given to the subject of proper nutrition as a factor in normal growth and development, to the eradication of faulty food habits and to the establishment of proper and well balanced diets, and a keener appreciation is being shown of the significance of the vitamins.

The attack against tuberculosis represented what may be termed the second public-health movement at the beginning of the present century. The persistence of Trudeau established the philosophy of sanatorium care. The voluntary agencies in this field not only did much to lay the foundation for a better understanding of the methods by which tuberculosis might be controlled but also in the formative years conducted clinics for diagnosis and treatment. Case finding, the isolation of the infected person, the rounding up of contacts who have been exposed, occupational adjustments and pneumothorax are all a part of the modern campaign for coping with this problem. Today every health department of appreciable significance either maintains, or sees to it that there exist in the community, adequate facilities for tuberculosis control.

For a number of years the subject of the control of venereal diseases was approached, except in rare cases, with much diffidence and hesitancy. Gonorrhea and syphilis represent an important public health problem. Stimulated by the efforts of the National Society for Social Hygiene and more recently by the vigorous challenging efforts of Surgeon General Parran, and with the assistance of federal funds, a worth while program is constantly making further progress. The Massachusetts Department of Public Health, with the aid of the above mentioned funds, not only assists in the maintenance of a number of venereal disease clinics but stimulates the upholding of adequate standards. Of particular significance is the organiza-

tion of facilities for rounding up the lapsed cases in this field.

As the clock of time has advanced during the present century, there has been increasing recognition of the relation of housing to health and to the control of disease. We have recognized that adequate light, air and ventilation and the avoidance of overcrowding are minimum requirements in the field of human needs.

Massachusetts, as in many other directions, blazed the way in the formulation of necessary legislation for the protection of the health of its workers. Provisions for factory inspection, minimum hygienic standards in places of employment, protection against the hazards of industry and workmen's compensation are but some of the safeguards in effect today. The sanitary inspector has a vital place in the public health program, although some of his activities have changed in character.

There is a need for increasing recognition by those responsible for community health of the problems of mental hygiene and mental disease. A ray of hope is offered by the expansion of the child-guidance clinics conducted under official or voluntary auspices, which deal with the problem of faulty habits in children and the need for the correction of the environment to which the child is exposed. Certainly the tragically high prevalence of mental disease should focus attention on the need of more prevention.

Allusion has already been made to the fact that we are living in an era in which the emphasis is on personal health. Vigilant health officers appreciate the value of an understanding by the public of the functions and objectives of the health department. Healthful living needs interpreting in simple, understandable language. The spoken word in the clinic, in the lecture hall and over the radio, and the visit of the public-health nurse, can be opportunely utilized for educational health propaganda. The leaflet, the poster, the pamphlet may all serve the useful purpose of making people more health minded. Here and there health educators employed by health departments are living examples of changes in public health practice from police methods to education.

As deaths from preventable causes have been lessened and the average span of life increased, a large proportion of our population are living to middle and later life, with a consequent increase of the diseases prevalent in the older groups. Among these illnesses are cardiovascular disease, cancer and diabetes. This newer public health problem should be the concern of the health officer. While this does not imply that he must necessarily conduct medical activities for the treatment of these diseases, it is his obligation both

to educate the public as to methods for their contact, and to see that there are in his community an organized medical profession, and clinics and hospitals to cope with these problems

The health officer today integrates the efforts of administration—the findings of the statistician, the medical inspector, the public-health nurse, the milk and food and sanitary inspector, the laboratory technician and the school physician—with those of the representatives of the voluntary health agencies. Today, in cities of varying size, health services are frequently conducted on a district basis. Radiating out of health centers, founded to bring together under one roof in a spirit of service and of team play all concerned with the problem of health and welfare, these services attempt to present a united front against sickness and death.

Statistical figures appearing in this effort to point out improvements in health because of changes

in public-health practices tell but a part of the story. We can do much better. There are still too many deaths from preventable causes. We can add more years to the span of life, since we have knowledge and methods at our disposal possessing rich lifesaving values. We must create by education and by the conduct of adequate programs a greater desire on the part of everyone for life's most treasured possession, vigorous physical and mental health. With an appreciation of the dryness of figures, I close with the words of Dr. Charles V. Chapin, to whom all those interested in public-health progress owe so much.

Figures do not measure the terrors of epidemics, nor the tears of a mother at her baby's grave, nor the sorrow of the widow whose helpmate has been snatched away at the prime of life. To have prevented these not once but a million times justifies one half century of public health.

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DURING 1939, the Boston Medical Library enjoyed an exceptional year. It was used by over 10,000 persons. Thirty thousand books or pamphlets were spread before those individuals, in other words, about 10 per cent of the 300,000 items left the library shelves to fulfill their designed purpose, that of transmitting men's ideas as recorded on the printed page to the present generation. Some of the 30,000 spoke the language of yesterday, many the current verbiage of our day. Old, middle-aged, adolescent or infantile, all gave to the reader, one hopes, a source of inspiration to write better his own words or to treat more efficiently the sick who came under his care. To serve 10,000 persons in a year is no mean task, to serve them well is the standard set by the Boston Medical Library. The continued support of old members and the influx of new members in 1939 indicate that the library has maintained its standard and served its purpose.

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the journals likely to be called for by our readers. As the rarely sought periodical can be made available in a few days from libraries outside Boston, we believe that our needs were well met. Unfortunately our funds have prevented us from binding as many journals as we desired—only 584 volumes in 1939, as compared with 737 in 1938 and 900 in 1937. In spite of this, the journals are reasonably well preserved in temporary binders and will not suffer for some years. The librarian tenders his thanks to the members and organizations that contribute periodicals. Not a few of our state journals and many others are received from the *New England Journal of Medicine*. Many local medical societies have again come to our aid in helping to pay for foreign periodicals.

Books

Our main source of new books continues to be, fortunately for the library, the *New England Journal of Medicine*. These, a total of 335, were reviewed in 1939 by our generous members and a large proportion turned back to the library. To the reviewers the library is again greatly indebted. By their kindness the library maintains a current file of books, funds for the purchase of which are not at hand. A few new books come from other sources—donations from library members, gifts from authors and review copies from the *Bulletin of the Medical Library Association* and the *Journal of Bone and Joint Surgery*. These books are con-

stantly in demand and are fulfilling a need, especially for students. Our book funds allow for the purchase of replacements and a few books not received by the Book Review Department

Rare Books and Books of Reference

To the Bullard and Hyams collections a few items have been added. The funds are nearly used up and only occasional purchases can be made. The collections are being used and correlated with similar collections elsewhere. We are constantly in touch with the Rare Book Room at the Harvard College Library and with the Boston Public Library. Additions to our books are known to others and we, in turn, keep in touch with the activities of our neighbors. We look at the problem in a broad manner, refuse to compete or duplicate and always keep in mind the growth of medical and scientific literature in Boston and its vicinity. To the true scholar, a book near at hand is practically as valuable as a book at hand. The *Union Catalogue* now nearing completion, is his most valuable asset.

Our stock of reference books is constantly maintained and augmented. Money spent for this type of book is money well used, items of reference soon become rare, almost never obsolete. Our error is usually that of not buying enough copies when issued, with covers worn off and dog-eared pages, how often we wish we had a second, fresh copy as the years pass. The Harvard College Library, the Boston Public Library and the Massachusetts Historical Society aid us in acquiring the more expensive and rarely used reference books. Our collection is surprisingly complete, however, thanks to the director's long interest in books about books and the indispensable material that subjoins a superb collection of fifteenth-century books. Rarely does one have to step outside our door to identify a rare book catalogued by a dealer.

The director's wide acquaintance with book sellers and their wares brings not a few choice items to our attention before they go into the general market. Our purchases have with increasing regularity, become of the over-the-counter type, an advantage to both seller and buyer.

A paper on "The Plague Tracts in the Boston Medical Library" has recently been completed by the director and the librarian. The library has 30 items published before 1501 listed by Klebs and Sudhoff and 4 additions, including a *Pestblatt* unique in character. The Bullard and Hyams collections thus furnish material for research. Some of the additional books are described for the first time in literature. Klebs's *Short Title List* the value of which was pointed out in the

1938 report, has again been used as a basis for describing the books.

A visit to the Scandinavian countries during the summer, just before the outbreak of the war, enabled the librarian to renew old acquaintances, make new friends and purchase a number of items for the library. Important reference books on Danish, Swedish and Norwegian medicine were added to our collection and one incunabulum was acquired. The rare item was the *Naparsuma sonut Ikjortiksut* one of three known copies of the first medical book printed in Greenland. The book in the Eskimo language, was set up on a hand press and printed in 1856. It is one of the earliest books printed in Greenland and describes the diet provided for the sick and the care of open sores. A friend in Copenhagen has made an English translation, and plans are under way to publish the small volume in facsimile, with an English and Danish translation. Vilhjalmur Stefansson, the Arctic explorer, has shown great interest in the book, and because of his well known knowledge of the dietetics of the Eskimo it is expected that he will write an introduction. When purchased, it was thought that our copy was the only survivor except for the one in the Royal Library at Copenhagen. A third copy, however, has been found in the Krabbe Library,¹ now at Stanford University.

In 1929, the director² catalogued 179 items in the Bullard Loan Collection. With the passing years the collection has more than tripled. A new catalogue is badly needed, and it is hoped that funds will not long be delayed for assessing this remarkable group of books and placing the results in printed form. Much of the work on such a catalogue has already been done.

In contrast to the fifteenth-century collection in the library, separately housed, the books published in the sixteenth century, usually grouped in a section of books issued between 1501 and 1640 were widely separated on our stacks at the beginning of the year. Stimulated by *A Bio Bibliography of XVI Century Medical Authors* by Dr. Claudius F. Mayer, specimen pages of which were issued with Volume IV of the Fourth Series, *Index-Catalogue of the Library of the Surgeon General's Office* (1939) and by the interest in these items manifested by the Harvard College Library, we have begun to shelve this valuable group of books, particularly the English imprints in Holmes Hall. They are separately classified, the English items being checked with Pollard and Redgrave's *Short Title Catalogue*.³ This practice is in keeping with the accepted procedure in the large libraries. In addition special groupings of Americana are being made, as well as travel

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was to send to the library a gift of money to preserve the books of Oliver Wendell Holmes.

The co-ordination with other libraries continues in the past. New advances have been made in the exchange of material with the library of the Harvard Medical School. Our collection of theses is now largely catalogued. An informal committee has met occasionally to consider the broad vista of the medical library situation in Boston. Opinions are being formed which may be of considerable value in the future in regard to whatever problems have to be met.

Finally, the librarian again calls the attention of the members to our devoted, small staff. Without unusual personnel our library could not function with the small number of people employed. Even so, the library could use double the force and still not fulfill its most desired purpose. For the present, however, the year has passed without serious complaint and with much generous praise.

The librarian knows how richly the praise is justified. The public, students, members and guests all come to our doors. Rarely does one leave without a realization that the Boston Medical Library plays an important part in the medical and cultural life of Boston. May it never play a lesser role!

HENRY R. VIETS Librarian

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FEVER THERAPY IN ALLERGIC DISEASE

ROBERT W. HYDE, M.D.*

FAIRFAX, VERMONT

FEVER has been used as a therapeutic agent in bronchial asthma since 1931. Favorable results of varying degree have been reported by Fenberg, Osborne and Steinberg,¹ Halphen and Audclair,² Sheldon,³ Phillips,⁴ and others. The technics have been varied, with temperature elevations varying from 101 to 107°F, durations from forty five minutes to eight hours and the number of treatments from one to fourteen. In my cases of bronchial asthma less fever was found necessary than in those reported by other workers, so that although the series is small, I feel justified in reporting it.

Owing to the fact that the high temperatures that were first thought necessary for therapeutic effect constituted an excessively severe treatment for hay fever and urticaria, very few reports of this type of treatment in such conditions have appeared. Le Boutillier⁵ mentions favorable results in 5 cases of hay fever. Trautman⁶ reports negative results in 2 cases of hay fever, and favorable results in 1 case of urticaria. Litterer and Phillips⁷ report favorable results in 80 cases of urticaria. Hence I believe that the hay fever cases presented here are a worthwhile addition to the reports on the subject.

Fever therapy was administered in 32 cases of

*Superintendent, Mount Mansfield Sanatorium, Fairfax, Vermont.

allergic disease. These were selected from about 100, seen over the same period of time, because they had not responded to simpler methods of treatment. No attempt was made to distinguish the different etiologic factors in the cases of bronchial asthma and hay fever that were treated. Nor is any attempt made to explain the rationale of therapeutic fever in allergic disease. I merely wish to show the results obtained from a certain minimal amount of fever treatment in these cases.

TECHNIC AND MANAGEMENT

In the technic used, all fever treatments consisted of elevating the patient's temperature to not over 103°F (axillary) for not longer than one hour. The majority of treatments consisted merely in elevating the temperature to 102°F in twenty five minutes, with immediate termination of the treatment, allowing the temperature to subside gradually to normal. This degree of fever is less than that reported by any authority except Phillips⁴ and Le Boutillier,⁵ and the duration is less than any other reported.

All fevers were induced in a humidified external heating type of cabinet. No claim is made here for the superiority of one type of fever induction over another, so long as the method

used can be properly controlled and can produce a rapid induction of fever

Care was taken in all cases to supply abundant fluids in the form of saline and glucose, so as to prevent bodily depletion. All premedication, preparation and supervision were conducted along recognized lines,⁸ except that no sedation was given before or during fever, other than 40 gr of sodium bromide to certain apprehensive individuals

Bronchial Asthma

In patients with asthma, the management consisted in administering one treatment daily until what was considered to be a primary response to

Table 1 shows the results of treatment in the cases of bronchial asthma. The statements as to the clinical improvement are based on the follow-up history, and on short periods of observation only of such patients as had subsequent attacks of sufficient severity to require calling a physician. No prolonged period of hospital observation was possible before or after treatment.

In Case 1 the patient obtained only temporary relief from fever therapy, but after tonsillectomy he improved clinically. In Case 3 the patient received a course of carbon-arc ultraviolet treatments in addition to fever therapy. In Case 13 the patient received "cold" vaccine throughout the following winter. In Case 15 the patient was

TABLE 1 Data on Cases of Bronchial Asthma

| CASE NO. | DURATION OF DISEASE | SEVERITY | PREVIOUS TREATMENT | NO. OF FEVER TREATMENTS | | LENGTH OF REMISION FOLLOWING TREAT- MENT | IMPROVE- MENT* LESSENED SEVERITY AND DURATION | RELIEF FROM ADRENALIN | |
|----------|---------------------------|--------------------|-----------------------|----------------------------|----------------|---|--|--------------------------|-------------------------|
| | | | | FIRST YEAR | SECOND YEAR | | | BEFORE TREAT- MENT | AFTER TREAT- MENT |
| | yr | | | | | mo | | | |
| 1 | 7 | Moderate | Usual* | 2 | Discontinued | Usual§ | No | Yes | Yes |
| 2 | 10 | Intractable | Thorough† | 4 | —‡ | 3 | Yes | No | — |
| 3 | 50 | Moderate (conunus) | Thorough | 2 | 0 | 10 | Yes | — | — |
| 4 | 20 | Intractable | Thorough | 2 | 0 | 3 | Yes | — | — |
| 5 | 25 | Intractable | Thorough | 5 | 1 | 8 | Yes | No | Yes |
| 6 | 3 | Mild (continuous) | Little | 4 | Discontinued | Usual | No | — | — |
| 7 | 7 | Severe | Thorough | 1 | — | 3 | Yes | — | — |
| 8 | 30 | Severe | Thorough | 2 | 1 | 2 | Yes | No | Yes |
| 9 | 6 | Severe | Thorough | 2 | — | Usual | Yes | — | — |
| 10 | 19 | Intractable | Thorough | 3 | 0 | Usual | Yes | No | Yes |
| 11 | 8 | Moderate | Usual | 1 | Discontinued | Usual | No | — | — |
| 12 | 60 | Intractable | Thorough | 4 | — | 3 | — | — | — |
| 13 | 24 | Severe | Thorough | 3 | 0 | 3 | Yes | Yes | Yes |
| 14 | 6 | Severe | Usual | 1 | — | Usual | Yes | — | — |
| 15 | 15 | Intractable | Thorough | 8 | 2 | 3 | Yes | No | Yes |
| 16 | 23 | Intractable | Usual | 1 | 0 | Usual | Yes | — | — |
| 17 | 4 | Severe | Thorough | 2 | 0 | 10 | Yes | No | Yes |
| 18 | 16 | Intractable | Usual | 1 | 0 | 3 | Yes | — | — |
| 19 | 50 | Intractable | Little | 2 | 0 | Usual | Yes | — | — |
| 20 | 57 | Intractable | Little | 1 | Discontinued | Usual | No | No | No |

* Usual signifies that the patient had been under good general medical management with little specialized treatment.

† Thorough signifies that the case had been thoroughly studied and treated from every conventional angle in a good hospital.

‡ Dashes are used when the treatment did not extend over the time mentioned or the therapy specified was not used.

§ Usual signifies no change in the interval between attacks.

fever had been obtained. This response consisted in a decrease of bronchospasm, increase of moist rales, a productive cough and the subjective feeling that the attack was beginning to subside. The patient was instructed to return immediately if the improvement did not continue. An additional treatment was given in three days, if the attack was not completely terminated by that time. The schedule for further treatment consisted of instructing the patient to return on the first sign of an oncoming attack, when therapeutic fever was administered at any time of day or night after one hour's preparation of the patient.

No attempt was made to subject the patient to fever therapy when entirely symptom-free. As will be seen, the response to fever was so varied that I did not consider it justifiable to lay out any arbitrary course of treatments, but rather sought to individualize each case.

instructed in and performed chest exercises. In the last three cases the concurrent treatment was thought to be only contributory to the results obtained. No other patients received treatment that could have been responsible for the clinical improvement they exhibited.

As shown by the table, 20 patients with bronchial asthma received an average of two and a half treatments in one year. Twelve had clinical remissions of three to ten months. This was in addition to whatever spontaneous remissions were usual in their cases. The remissions were followed by attacks of decreased severity, frequency and duration. Three other patients were clinically improved in that the attack terminated more abruptly and the subsequent attacks were less severe. Hence a total of 75 per cent of the cases showed clinical improvement. No case was asymptomatic one year following treatment. Seven of

12 patients under observation the second year had attacks that responded so easily to home medication that they no longer returned for fever or sought other medical advice.

Four patients who had been unable to obtain relief with adrenalin in any form for several years prior to fever therapy were able to obtain satisfactory relief for at least one year after therapeutic fever. No attempt was made to explain this, or to determine whether it was true of all cases improved by fever.

A variation was observed in the time and type of primary response to fever therapy when it was administered during the asthmatic attack. Although there are an insufficient number of cases to allow any definite conclusions, the fact that the response occurred at any time from the induction stage of the fever session until twenty-four hours later is worthy of note. In a few cases the attack

TABLE 2. Immediate Results of One Fever Session in an Attack of Bronchial Asthma (by Number of Cases)

| Condition | DURING FEVER | 1-3 hr. | AFTER FEVER 3-6 hr. | 12-24 hr. | 24-48 hr. |
|-----------|--------------|---------|------------------------|-----------|-----------|
| Improved | 7 | 10 | 10 | 15 | 11 |
| No change | 8 | 10 | 6 | 5 | 9 |
| Worse | 5 | 0 | 4 | 0 | 0 |

terminated with so little productive cough that it was a surprise to the patient.

As shown in Table 2, in 11 cases only one treatment was needed to cause a remission. Of the re-

Hay Fever

The following cases of hay fever were observed frequently throughout the season, so that the follow up is reliable. The management of the cases in no way differed from that of those of bronchial asthma. In hay fever the primary response to fever was considered to be a decrease in conjunctival irritation and in edema of the nasal mucous membrane. The treatments were repeated until this result had been obtained to a lasting degree.

No concurrent specific desensitization treatment or local or general use of vasoconstrictors was permitted. The patients made no attempt to avoid offending pollens while under treatment or subsequent observation. The only concurrent treatment was the oral administration of calcium in cases where the patients did not drink milk, and the giving of potassium chloride, 5 gr. three times daily, when mild or transient symptoms were apparent the third season, the latter occurred in 4 cases in which marked improvement had been shown the second year.

Nine of 11 cases (81 per cent) treated showed clinical improvement (Table 3). One case was asymptomatic one season following treatment, and 2 were asymptomatic for two seasons following treatment. Two patients had symptoms so mild and transient that they did not seek medical attention. Four patients had mild symptoms the third season, for which they took potassium chloride, as mentioned above.

TABLE 3. Data on Cases of Hay Fever

| Case No. | Duration | Result of Desensitization | Severity | Number of Fever Treatments | | | Asymptomatic | Improved |
|----------|----------|---------------------------|----------|----------------------------|--------------|------------|--------------|----------|
| | | | | First Year | Second Year | Third Year | | |
| 21 | 37 | — | ++ | 2 | 0 | —† | No | Yes |
| 22 | 5 | — | ++ | 1 | 0 | 0 | No | Yes |
| 23 | 3 | Slight | + | 1 | Discontinued | — | No | No |
| 24 | 2 | None | +++ | 2 | 0 | — | Yes | — |
| 25 | 5 | Slight | + | 1 | Discontinued | — | No | No |
| 26 | 20 | None | ++++ | 9 | 4 | 0 | No | Yes |
| 27 | 2 | — | +++ | 2 | 0 | 0 | Yes | — |
| 28 | 7 | — | ++++ | 1 | 0 | 0 | Yes | — |
| 29 | 11 | — | ++++ | 4 | 1 | 0 | No | Yes |
| 30 | 10 | None | ++ | 3 | 1 | 0 | No | Yes |
| 31 | 6 | — | ++++ | 2 | 1 | 0 | No | Yes |

Dashes indicate that no desensitization had been done.

†Dashes signify that the patient was not under treatment at the time indicated.

maining 9 cases that showed no change from twenty-four to forty-eight hours after fever, a second treatment was necessary in 3 cases and a third treatment in 2. In Case 13 the patient, who had been constantly asthmatic for eighteen months, received one fever session every other day and obtained no relief until after the fourth session when she had a complete remission. In 3 cases there was a relapse after obtaining a primary response to fever.

The number of cases treated were insufficient to permit material conclusions as to the primary response in hay fever. All the patients treated exhibited some transient improvement immediately afterward, but in several this was not sufficient to be considered a remission. This cannot be explained on the basis of dehydration or change in acid-base balance, as care was taken to prevent any such change. In 4 cases only one treatment was necessary, in 4 two treatments and in 1 three.

Three patients had a remission after a primary response

Chronic Urticaria

One case of chronic urticaria was treated. A sixteen-year-old girl, who had suffered for three years from severe bronchial asthma and hay fever, the latter of which at the time of treatment was partially controlled by eliminative diet and specific desensitization, also suffered from urticaria of eight months' duration, which was present daily, and much worse at night.

The first fever treatment was given February 25, 1939, and was followed by a remission of the urticaria for five days, and then a recurrence worse than before. The second fever therapy on March 8, 1939, was followed by remission of the urticaria for seven months. Hay fever was slight or transient through the 1939 season. There was complete remission of the bronchial asthma for four months, and only mild symptoms were noted the subsequent seven months.

REACTIONS TO FEVER

Although no attempt is made to interpret reactions, what was considered to be such was noted in 6 cases. This fact is mentioned here merely because it may prove to be of significance in determining the mechanism of the effect of therapeutic fever on allergic disease.

Four patients with bronchial asthma experienced very severe attacks three to six hours following the fever session, after they had received some primary relief. One patient with hay fever, sensitive to timothy, ragweed, goldenrod and paintbrush, developed urticaria over all exposed areas of the body while working in a hayfield the day following fever therapy. No previous history of urticaria in this case was obtained. The patient suffering from chronic urticaria developed an acute attack during the fever session while the temperature was subsiding to normal. For some reason the lesions did not itch.

DISCUSSION

No claim is made as to the cure of bronchial asthma or of any other allergic condition with fever therapy. In fact, none of the cases of bronchial asthma reported here were asymptomatic when observed one year after the treatment. Owing to the fact that most workers have used far different technics with no comparative study, the optimal technic of administering therapeutic fever in allergic conditions is yet to be determined. Phillips and Shikany⁹ considered a minimal course of ten treatments necessary, with fifteen treatments preferable. Feinberg, Osborne and Steinberg¹ administered a course of two intermediate

fevers, sometimes repeating them in case of relapse. Phillips's results seem superior to those of the latter workers, but it must be considered that they were dealing only with intractable cases. Miller and Piness¹⁰ obtained only temporary relief in 2 out of 7 cases, using one fever session.

None of the cases in this report received as many fever sessions as were considered desirable. Because of lack of co-operation of some of the patients, no opportunity was given to treat any subsequent light attacks or to continue therapeutic fever until the patient was in improved general health. There is reason to believe that the results would have been better if more fever sessions could have been administered. This belief is based on the fact that marked improvement was obtained in 7 of the 8 cases of asthma receiving three fevers or more, and that Cases 5 and 15, which were exceptionally severe and received the most treatment, have exhibited the most complete improvement. Both these patients had been entirely incapacitated for work for over eight months prior to fever therapy, and have been able to carry on their work for one year and two years, respectively, subsequently. This opinion as to the optimal number of fever sessions is in agreement with the conclusion of Phillips.

As to the type of fever session most efficient in the treatment of allergic disease, the most unfavorable reports seem to come from those using long, high fevers. Trautman⁸ reported no improvement in 5 cases of bronchial asthma treated at 104 to 106°F and in 2 cases of hay fever treated at 103 to 104°F for five hours. Five treatments were given, so that the results can not be attributed to too few fever sessions. Metz¹¹ obtained relief in 3 of 8 cases with a fever of 106°F for three hours. Phillips and Shikany⁹ reported in 1935 "Temperatures above 105°F really have no advantage over those ranging between 102 and 105. Temperatures sustained for four hours produce results comparable to those extending over longer periods." In 1936 Phillips⁴ reported that he was treating a group of patients with fever of 101 to 102°F for forty-five minutes; he considered this technic satisfactory. Le Boultelier,⁶ using fevers of not over 103°F, reports uniformly favorable results in 9 cases of bronchial asthma and 5 cases of hay fever.

It would seem rational to expect that the strain of the high fever on the asthmatic patient, already struggling for breath and debilitated by his prolonged attack, would partially counterbalance any beneficial effect that an induced fever might have on the condition.

I have tried several types of fever elevation in bronchial asthma, although in too few cases to

furnish any definite conclusions, but enough to give the impression that short elevations of temperature to 102°F give results at least comparable with, if not superior to, those obtained with higher and longer fever sessions. In addition there are the added advantages of the reduced strain, the lessened danger and the greater economy of the lower fever. It is possible to treat many aged arteriosclerotic patients for whom higher fevers would be contraindicated. Conditions such as hay fever, urticaria and eczema, which one would be reluctant to subject to a high or intermediate fever, can be treated. The cost of fever is so reduced that the short low fever technic can be used with patients who would be unable to afford the costly long high fever technic.

These cases demonstrate the facts that a certain amount of lasting improvement can be obtained in many cases of allergic disease from a small number of low fever sessions, and that this technic may be found useful where conditions make it difficult to administer what is considered to be the optimal number of fever sessions.

SUMMARY

A total of 32 cases of allergic disease were given

therapeutic fever in a humidified external heating type of cabinet.

The results with a small number of short low fever treatments correspond favorably with those obtained with a greater number of longer and higher fevers, in that 75 per cent of the asthma cases and 81 per cent of the hay fever cases showed clinical improvement.

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REPORT ON MEDICAL PROGRESS

TUBERCULOSIS

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IN MASSACHUSETTS in 1939 there was again a drop in the death rate from pulmonary tuberculosis. The unofficial figure for that year is 33.8 per 100,000 population, as opposed to 34.9 in 1938 and 40.0 in 1937. Figures from other states are not yet available. There is, however, an interesting report from the Metropolitan Life Insurance Company¹ showing that in its group of industrial policyholders in 1939 the tuberculosis death rate was 44.9, a 4.9 per cent decline for the year. This rate was a little more than half that recorded in 1929 and one fifth that of the company's first report in 1911.

CONTROL PROGRAM

The years are bringing changes in the methods for hastening the decline in the morbidity and mortality of pulmonary tuberculosis. At one time it was believed that pulmonary tuberculosis was

always contracted in childhood, and that it was such childhood lesions that flared into activity later in life. Efforts were therefore directed principally toward finding infected children and treating them in outdoor schools and preventoria in the hope that their lesions could be so securely healed that they would never again become active. We have learned much from studying large groups of school children, and thousands of people have been taught the principles of hygiene in summer camps and preventoria. With the decline in the incidence of tuberculosis, however, so few cases of active disease are now found in a whole state study of young school children that the results in many sections of the country do not justify the expense. A survey by Remick and Chadwick² in Middlesex County disclosed that in 1938-1939 it cost \$3500 to discover each case of active disease in the school clinics. These clinics have therefore been discontinued and more attention is being paid to the study of contacts of sanatorium pa-

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terested in first infections, and has asserted repeatedly that "the primary complex as it develops in the body of an adult is a benign disease and apparently is of no more clinical significance than the primary complex which develops in the body of a child." In substantiation of this statement he and his associates report a group of 557 nurses and medical students who became reactors to tuberculin while under observation, none of whom developed active pulmonary tuberculosis.

Myers's contention has been challenged by a number of authorities in this country and abroad. In a letter to the *Journal of the American Medical Association*, Malmros,¹⁷ of Sweden, has recently objected to it. He agrees that in the great majority of cases the lesions are asymptomatic and do not progress to manifest disease, but he maintains that "in a considerable number of cases the initial apical lesions were the first manifestation of a progressive type of pulmonary tuberculosis" and that it is not safe to consider the infection benign just because it is primary.

Malmros's observation was borne out by Badger and Spink's¹⁸ study at the Boston City Hospital, in which they noted 7 cases of primary infection with x-ray lesions occurring among student nurses. Of these cases 3 never developed symptoms, 2 became arrested with sanatorium care and 2 progressed in spite of sanatorium treatment.

It seems evident, therefore, that one must not be too much influenced in prognosis by whether the infection is primary or secondary, but must take all the other factors into consideration in planning treatment.

One of the difficulties in this whole problem has seemed to me to be that writers have spoken of the primary infection as if it were a single infection occurring in a non-sensitized individual. They have not considered the facts that in almost every case there must be repeated exposure and that since sensitization develops within three weeks from the first exposure many of the infections must be on a sensitization basis and, therefore, of the reinfection type. The size and frequency of the dose of tubercle bacilli and the interval between exposures must necessarily play important parts in determining the nature of the lesion.

CHEMOTHERAPY

Some years ago Wells and Long¹⁹ pointed out the theoretical difficulties involved in the chemotherapy of pulmonary tuberculosis in human beings. It is necessary to find a chemical that will not only kill tubercle bacilli in vitro but will also prove itself capable of penetrating an avascular tubercle, enter the phagocytic cells within the tu-

bercle and kill the "wax-armored tubercle bacilli" in the phagocytic cells. This is a great deal to expect, and laboratory research has shown that sulfanilamide and sulfapyridine do not meet the requirements. If the development of a tuberculous lesion is to be inhibited in laboratory animals, these drugs have to be given in seven times the usual clinical dose, and treatment must be started a number of days before the animal is experimentally infected with tubercle bacilli. Even then the development of the tuberculous process is only retarded and not prevented. It is not surprising, therefore, to find little encouragement from the few reports that have been made on the use of these chemicals in patients with pulmonary tuberculosis.

Nayer and Steinbach²⁰ report on 8 patients with extensive bilateral pulmonary tuberculosis who were given sulfanilamide from ten to seventy-one days with no apparent effect on the disease. Freilich, Coe and Wien²¹ treated 35 patients with moderately or far-advanced tuberculosis over a period of ten to fifteen weeks with sulfanilamide. The drug was given by mouth in 10-gr doses three times a day, and was gradually increased to 20 gr three times a day over a period of one month and kept at this level for the following six to ten weeks. The authors concluded that sulfanilamide was of no apparent value in altering the course of patients with pulmonary tuberculosis.

Faniel et al²² gave sulfanilamide to several patients, but reported that the treatment resulted in no appreciable modification of symptoms. They believe that the drug may act favorably on associated organisms without affecting the tubercle bacillus.

Allison and Myers²³ treated with sulfapyridine 7 patients having active pulmonary tuberculosis and 1 with acute generalized miliary tuberculosis. The patients were given the drug for a relatively short time, and no evidence was obtained that sulfapyridine influenced the course of the disease.

This group of over 50 cases is too small to justify final conclusions, but present evidence does not warrant the use of sulfanilamide and sulfapyridine in the treatment of pulmonary tuberculosis unless there is a definite secondary infection with organisms that are susceptible to the drugs.

PROGNOSIS OF PLEURISY WITH EFFUSION

Primary pleurisy with effusion has long been considered tuberculous unless otherwise proved, and figures reported early in the century are quoted to show that about 40 per cent of these cases later developed active pulmonary tuberculosis. These figures, however, are based on cases studied before x-rays had come into use, and it

is probable that a large proportion of them were not really primary pleurisy but pleurisy secondary to pulmonary tuberculosis, which a roentgenogram would have proved. With present x-ray facilities it is possible to determine with a high degree of accuracy whether pulmonary infection is present at the time the pleurisy develops, and only those cases with negative lung fields are now classed as primary pleurisy with effusion.

Study of the pleural fluid does not prove that all these cases are tuberculous, since the number of tubercle bacilli in the effusion may be very small. Guinea-pig inoculation has been positive in from 23 to 55 per cent of the cases in the various series reported. A recent survey of 58 cases studied at the Massachusetts General Hospital from 1916 through 1938 with no evidence of pulmonary lesions gave only 14 per cent positive findings on guinea-pig inoculation. This is a surprisingly low figure, but does not disprove a tuberculous etiology.

Trudeau²⁴ has recently reported a follow-up study of 54 cases of primary pleurisy with effusion that were followed from three to twenty-five years. Of this group only 4 patients developed evidence of pulmonary tuberculosis, and in 1 of these the lesion was doubtful. Trudeau concludes, "The prognosis of pleurisy with effusion with either negative, doubtful or extremely slight apical pulmonary findings by X-ray is excellent in patients receiving at least four months of sanatorium care, in fact, it is practically as good as the normal adult population in the same age group. This is an important factor in prognosis, but one must remember that all these cases had at least four months of rest treatment."

ETIOLOGY OF SPONTANEOUS PNEUMOTHORAX

In the past, spontaneous pneumothorax, like pleurisy with effusion has been considered tuberculous. Studies published during the last ten years, however, have all pointed to the nontuberculous etiology of this condition when it develops in a previously healthy person. The subject has been carefully summarized by Perry²⁵ who shows that of the 250 published cases only 2 per cent of the patients later developed tuberculosis. He describes the currently accepted explanation of this condition as the rupture of an emphysematous bleb. This bleb forms as a result of congenital defect, fibrous valvular obliteration of the

smaller bronchi or localized emphysema. Thoracoscopic examination will often reveal the lesion on the surface of the lung. Perry concludes: "Rest in bed for one week should be sufficient to allow the perforation to heal. Sanatorium treatment is quite unnecessary." In his series the pneumothorax recurred in 44 per cent of cases, other authors report recurrences in as high as 20 per cent.

Ylvisaker, Kiessling and Kirkland²⁶ report 17 cases of spontaneous pneumothorax among employees of a large business organization. In none of these could tuberculosis be proved, and of 13 cases tested with tuberculin 5 were negative.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26201

PRESENTATION OF CASE

A sixty-six-year-old white woman was admitted to the hospital complaining of indigestion for a period of twelve years.

About twelve years before admission, following the death of her husband, the patient began having vague digestive symptoms characterized by anorexia, abdominal distention and "gas." These complaints persisted until about five years before entry when they became worse. X-ray studies at that time revealed a "high cecum, irritable colon and gallstones." Her stools became rather "shredded" in appearance and light in color, but she was otherwise well and lost no weight until one and a half years before admission, when she developed a vague dragging distress localized in the right lower quadrant of the abdomen and aggravated by the upright position. She also noticed that the ingestion of "rough" food increased these symptoms, and that gas seemed to be constantly moving around in the bowels. At that time roentgenograms of the abdomen showed "old tuberculous disease of the cecum." She was placed on a low-roughage, low-residue diet, and the symptoms improved but did not abate entirely. She then developed a severe case of "shingles" over the right thorax, with fever and a weight loss of a few pounds, from which she recovered uneventfully. About six months before entry the patient felt weak and her blood was found to be "low"; vitamin B complex with iron (Elixir Feosol) was prescribed. The blood did not respond to treatment, and she continued to feel weak. She became anorexic and lost weight, and developed pain in the right lower quadrant.

X-ray studies of the chest in an outside hospital showed "no parenchymal tuberculous infiltrative change." A gastrointestinal series was negative, except that the colon was hypermobile and there was delayed emptying time in the terminal ileum, one of the folds of which lay in the right iliac fossa and was moderately dilated. The cecum remained high, as previously noted, and between the cecal end and dilated fold there was an area of narrowing. Some external pressure changes were evident against the other coils of ileum, caused by rather marked thickening of the wall of

the terminal ileum or surrounding inflammatory change, possibly involving either the omentum or the surrounding lymph nodes. A barium enema was negative except for the extension of a slight amount of barium through the ileocecal valve into the narrowed terminal ileum. The colon was well emptied after evacuation. The stools remained "normal", no constipation, melena or other symptoms were noted.

Thirty-four years before admission she had undergone an appendectomy.

Physical examination revealed a fairly well developed and nourished woman who showed evidence of recent weight loss but did not appear sick. The examination was negative except for the presence of a firm, irregular, non-tender fixed mass, measuring about 8 by 11 cm., located in the right lower quadrant of the abdomen. The blood pressure was 112 systolic, 70 diastolic.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red-cell count of 3,900,000 and a white-cell count of 15,200. The serum nonprotein nitrogen, chlorides and protein were normal. An electrocardiogram was normal.

The patient was transfused, and on the eighth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. GRANTLEY W. TAYLOR: Were the x-ray films taken here or outside?

DR. AUBREY O. HAMPTON: They were done outside, but we have copies. I do not agree with the interpretation. This, which was interpreted as cecum, is not the cecum. It really lies here, and most of the narrowing is in the ascending colon and cecum, both of which are diffusely involved by a similar process and are definitely shortened. It is true that the ileum is also involved and that the diameter of its lumen is reduced to almost a millimeter in the upper portion of the lesion, yet no real obstruction is present. One point in the ileum, which I should like to see much better, appears irregular, and there is a diverticulum-like pouch proximal to the constriction, as if the ileum had been working against obstruction over a long period of time.

DR. TAYLOR: You cannot say anything about the mucosal pattern from the film?

DR. HAMPTON: I think it is destroyed. The end of the defect is conical, rather than overhanging, as you might expect if that were malignant. She also had gallstones.

DR. TAYLOR: The x-ray diagnosis of tuberculous disease of the cecum was made one and a half years before admission. Are those films available?

DR. HAMPTON No

DR. TAYLOR Is it reasonable to make a flat footed diagnosis of cecal tuberculosis by x ray?

DR. HAMPTON There is a typical picture of ileocecal tuberculosis, but we do confuse it with ileitis.

DR. TAYLOR We have here, not to be elaborate about it, a longstanding history of gastrointestinal disturbance, the symptomatology of which is accounted for by what was found, namely an obstructive lesion involving the ascending colon in the region of the ileocecal valve and a large fixed mass. The problem is simply to decide what that mass was.

One should consider the possibility of foreign bodies following laparotomy, but the appendectomy was done some thirty four years before, and it seems to me that she would not have been likely to have anything starting as a sequela of that. We have seen inflammations due to perforation of the terminal bowel by foreign bodies. Tooth picks and porcupine quills will sometimes give rise to inflammatory masses in this region, but the conspicuous thing about the course is that except for the white count there was nothing to suggest an inflammatory process. In fact, we have to go at this with very little help except that there is some thing here by x-ray that there is a palpable mass and that is all. The laboratory studies do not contribute very much. No blood was noted in the stool examinations. There was a slight anemia—3,900,000. There are inflammations which would not have to show acute leukocytosis, such as tuberculosis and actinomycosis, but I do not see that we have anything except previous x-ray studies which would justify us in assuming that we are dealing with tuberculosis or actinomycosis. Ileitis is not at all common in elderly people, and with a twelve year history this patient should have had more overt manifestations of an inflammatory process, if ileitis had been present. One cannot rule it out, nor can one say that this is not tuberculosis, but both seem to me definitely unlikely. The chest plates showed no evidence of tuberculosis.

We then come to neoplasms, and against neoplasm is the long duration of the history and the relatively good state of health that she was in at the time of admission to the hospital. Carcinoma could not have endured so long. You can conceive of its developing on a pre-existing lesion, the nature of which I am unable to suggest. The same applies to lymphoblastoma. I had considered that we might be dealing in this case with a carcinoid on the ground that these tumors are essentially benign and may be present for a long

time without seriously impairing the patient's general condition. However, I do not see how we can say, on the strength of the material we have here, whether we are dealing with tuberculosis or with carcinoid. I am inclined to believe we are not dealing with a malignant neoplasm or a type of inflammatory change other than tuberculosis. Ulcerative colitis is a possibility, but there is nothing in the history to suggest the diagnosis. This lesion involves the terminal ileum and a restricted, localized area in the cecum. My first diagnosis is carcinoid, and my second, tuberculosis of the cecum.

DR. CLAUDE E. WELCH I can add but little. We were very much puzzled. As a matter of fact, we did not have Dr. Hampton's interpretation of the x-ray film, which might have some what changed our diagnosis. We thought we were probably dealing with a polyp of the cecum. The large size of the mass with no blood in the stools led to that diagnosis. She went through a two-stage resection without any difficulty.

CLINICAL DIAGNOSIS

Polyp of cecum

DR. TAYLOR'S DIAGNOSIS

Carcinoid

ANATOMICAL DIAGNOSIS

Tuberculosis of ileum, cecum and ascending colon.

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY The diagnosis proved to be tuberculosis. The entire cecum and ascending colon were markedly shrunken, contracted in to a few centimeters, as you see in the x-ray plate according to Dr. Hampton's interpretation. There were several ulcerations, but the major part of the process could be fairly classified as hyperplastic. We found one ulcer 7 mm in diameter and several minute tubercles in the ileum, but the major process was in the cecum.

DR. WILLIAM B. BREED Dr. Hampton, would you be willing to make a definite diagnosis of tuberculosis on that film?

DR. HAMPTON Yes.

CASE 26202

PRESENTATION OF CASE

A thirty year-old man was first seen by his physician when he complained of fatigue and of not having felt well for a couple of months. He gave a history of never having had anything to eat ex

cept milk and dry cereals, and on rare occasions a leaf of lettuce or a banana. The cereal had to be obtained from individual boxes, and the milk from a certain dairy. He was accustomed to drinking three quarts of milk a day and said that he took this in much the same manner as he put gasoline into his automobile—in order to make it go. He was unable to eat a meal with the rest of the family because the sight and smell of other food disturbed him. His mother had found when he was a baby that she was unable to introduce beef juice into his bottle of milk, or to give him any food other than plain milk. She had consulted various physicians during his infancy and childhood with reference to his diet, but was told that he would probably outgrow his distaste for food. While he raised chickens as a livelihood he had never tasted chicken meat and, until entering the local hospital, had never tasted the juice of an orange.

While a good businessman he was eccentric as to habits, having had no association with girls or young women and very few close friends among the young men of his acquaintance.

On examination his general appearance was poor. His pasty facies suggested nephritis, but nothing else unusual was found. The systolic blood pressure was recorded as 115.

Because of his general condition he entered a local hospital. While there the nurses were unable to persuade him to take any food but milk from a particular dairy, except that on occasions he took small amounts of creamed vegetables and orange juice. He was also given brewers' yeast and Chlorosalsterol in an attempt to increase his vitamin intake.

Examination of the blood showed a red-cell count of 3,420,000 with 82 per cent hemoglobin, and a white-cell count of 14,000 with 70 per cent polymorphonuclears, 20 per cent lymphocytes, 6 per cent monocytes and 4 per cent eosinophils. The platelets were normal. There was some polychromatophilia and variation in the size and shape of the red cells. The nonprotein nitrogen was 300 mg per 100 cc, but the technician reported the result as approximate, due to cloudiness of the solution. The blood sugar was 166 mg per 100 cc. A renal function showed no phthalein excretion. The blood Hinton test was negative. The urine showed a specific gravity of from 1.009 to 1.004, it contained a large amount of albumin, and nothing in the sediment except an occasional hyaline cast.

X-ray examination of the stomach revealed this organ to be of normal size, outline and position, with some spasm at the pylorus. A barium enema

showed a hypertonic colon, which was interpreted as being due to a simple colitis. The Graham test was negative. The kidneys were reported as normal in size, shape and position, with no evidence of urinary calculi. No evidence of abnormality of the heart or lungs was noted in x-ray films of the chest.

While in the hospital he suddenly developed complete prolapse of the rectum, which was successfully treated by painstaking care. After being in the hospital twenty-two days he was discharged home, in the care of a very competent nurse, because of more or less dissatisfaction at being away from home. There he developed a cough, which was not troublesome until the last three or four days of life, when opiates were required for its control. There was very little sputum. Another outstanding symptom was increasing difficulty in voiding urine. He required six to eight minutes to start the stream, which would then voluntarily stop, and the same process had to be repeated each time he voided. The daily fluid intake averaged 2250 cc, and the urinary output ranged from 600 to 1200 cc. The daily intake of milk varied from 360 to 720 cc, the highest being 930 cc. The milk was unpasteurized and obtained from a Guernsey herd, the cows being fed, the year round, with Eastern States balanced ration containing 20 per cent of protein, together with green pasturage in the summer and hay, ensilage and carrots during the winter. This source of supply had been used for eight years, and a similar one had been used for the twelve years previous. There was an intake of from 120 to 360 cc of orange juice a day, one or two eggs were ingested as egg-nogs, and very small quantities of cereal such as oatmeal or cream of wheat, small quantities of macaroni, lettuce, carrots, celery soup and a few crackers were included in the daily menu. He was also given 30 to 90 cc of olive oil, yeast tablets, Digalin for his heart, and Sodium Amytal as a base sedative for restlessness. The cough was aided in the beginning by syrup of hydriodic acid, but later on required codein.

Physical examination on the day before death showed a well-developed and well-nourished man lying in bed. He was oriented and talked freely. His appearance was that of a patient with chronic nephritis, owing to pastiness of the face and puffiness about the eyes. The pupils were normal, the sclerae were pale, and the fundi showed nothing except pallor. The breath was normal, and he was breathing quietly. The tongue was coated, the teeth were in good condition, the mucous membranes were pale. He had small

buried tonsils. There were no enlarged lymph nodes. The chest was symmetrical and moved normally on respiration, the only abnormal finding being slight dullness at the right base, with moist rales. The apex of the heart was not palpable, but the left border of dullness was made out just outside the nipple line. The rhythm was regular, the rate 140. The sounds were of poor quality. Gallop rhythm was present. The blood pressure was 135 systolic, 65 diastolic. There was no evidence of sclerosis of the peripheral arteries. The abdomen was moderately distended, and because of this and the thickness of the abdominal wall, palpitation was unsatisfactory, however, there were no apparent masses or palpable viscera. The penis and both testicles were distinctly small in size. The knee jerks were normal, and there was no edema of the legs or feet.

The urine specimen obtained at the completion of the physical examination was less than 30 cc. in volume, it was cloudy, contained a large amount of albumin and showed a negative sediment. The blood smear showed the following differential polymorphonuclears 89 per cent, lymphocytes 6 per cent, basophils 1 per cent and large monocytes 4 per cent. The red cells showed some variation in size, there was surprisingly little achromia. The platelets appeared normal.

Because of the serious state of the patient and the difficulty in feeding, the suggestion was made that the patient be transferred back to the hospital for tube feedings of a solution of milk, cream sugar, eggs and orange juice sufficient to make up about 2500 calories. He was transferred to the hospital on the following day, but while preparations were being made for treatment the patient suddenly developed what appeared to be a severe attack of pulmonary edema, and died about an hour thereafter.

DIFFERENTIAL DIAGNOSIS

DR. RICHARD J. CLARK. We are faced at the onset with the picture of a "peculiar individual," showing many of the earmarks of a psychopathic personality. For thirty years he had lived on three quarts of milk a day plus some dry cereals. Our immediate thought is that he may have been suffering from a deficiency disease. However, if he had taken three quarts of raw milk a day, he should have received adequate amounts of vitamins, protein and minerals with the exception of iron. He did lack the normal amount of intestinal bulk and roughage.

His primary complaint was one of fatigue, with no localizing systemic complaints. The physical examination was negative except for a nephritic facies.

The laboratory findings are somewhat surprising. He had a quite normal hemoglobin—82 per cent. The one recorded red-cell count was 3,420,000, indicating a rather high color index. The differential and smear were not suggestive of pernicious anemia. The nonprotein nitrogen of 300 mg per 100 cc. was strikingly high. Renal function by phthalein excretion was nil. The urine showed a fixed low specific gravity, with a large amount of albumin. The sediment was surprisingly negative. I presume that the blood-sugar level reported at 166 mg per 100 cc. was determined in a fasting specimen, it is somewhat high, although no glycosuria was noted. X-ray films of the kidneys showed normal size, shape and position. The gastrointestinal and chest films were essentially negative.

At the time of his first hospital discharge we are left only with quite definite clinical evidence of renal failure and laboratory evidence of uremia. There are several surprising factors in the situation. With a nonprotein nitrogen of 300 mg., a phthalein excretion of zero and a fixed specific gravity an elevated blood pressure is certainly to be expected with any ordinary type of nephritis. Also, more in the way of casts and cells in the sediment might be expected. It would be helpful to know something about the serum protein and sodium chloride, but this information is not given. There is no evidence for any specific type of pre renal azotemia. The normal appearing kidneys by x-ray tend to rule out congenital cystic kidneys, hydronephrosis and the like, as does the rather negative sediment. There is no past history given to indicate the onset of any acute nephritis. At the moment I am left with a diagnosis of renal failure, type uncertain.

After his return home he developed trouble in voiding urine. There is no report of a rectal examination and we know nothing about the prostate. In view of a urine sediment later that was still negative, it seems most unlikely that there was any growth or other factor causing an organic urinary obstruction. From the evidence at hand there is no proof of a cord lesion to account for this. I can only attribute this symptom to his state of general weakness.

It is stated that he also developed a cough. In view of subsequent events I should judge that this was coming from an early pulmonary congestion due to circulatory failure. A recent chest plate was negative, and we are not told that he had fever.

At the time of the examination on the day before death, he still showed a nephritic facies, but surprisingly we are told that he was well nourished. The fundi were negative. He apparently did not

have a uremic odor to his breath. He had some congestion at the right lung base. The heart showed some signs of weakening, with slight enlargement to the left and a rapid rate with sounds of poor quality and gallop rhythm. The blood pressure was relatively normal. There was no arteriosclerosis. The genitalia were small, being one bit of evidence for a possible endocrine dyscrasia, but there was nothing else to tie up with this. There was a large amount of albumin in the urine, the specific gravity is not given, and the sediment was negative.

The following day the patient developed acute pulmonary edema and died of what would seem to be acute congestive heart failure. Over the course of observation he had shown evidence of progressive myocardial weakness. There is no evidence for rheumatic, congenital or hypertensive heart disease. There is no arteriosclerosis or evidence for coronary disease. Hence, the heart failure must have been myocardial. With a state of relative malnutrition, did he have a beri-beri heart? On his original three quarts of milk a day, he should have had an adequate intake of vitamin B. Later, after discharge from the hospital, 360 to 720 cc of milk would not give an adequate intake, but when supplemented by yeast,—we are not told how much,—it would seem probable that the vitamin B intake was sufficient to prevent beri-beri. I can make no definite cardiac diagnosis, but believe that an enlarged heart will be found, with myocardial degeneration, and consequent pulmonary congestion.

I believe that the postmortem will show a chronic renal lesion which was most likely the primary cause of his death. It will probably be of the chronic glomerular type, but I am disturbed by the lack of hypertension and other vascular changes. The peculiarities of diet, with possible iron lack at first and more general deficiency later, probably contributed to his general weakness, but I suspect they were not the primary cause of his final illness.

There is very likely an unseen "catch" in this case to explain the low blood pressure and, possibly, the cause of the pre-renal azotemia. The postmortem findings should be most interesting.

CLINICAL DIAGNOSES

Food phobia
Chronic nephritis?

DR CLARK'S DIAGNOSES

Psychopathic personality
Chronic glomerular nephritis
Uremia

Myocardial hypertrophy and degeneration (beri-beri heart?)

Pulmonary congestion

Inanition from dietary inadequacy

ANATOMIC DIAGNOSES

Chronic glomerular nephritis

Acute pulmonary edema

Parathyroid hyperplasia, secondary

Cardiac hypertrophy, slight

Edema, slight, generalized

PATHOLOGICAL DISCUSSION

DR TRACY B. MALLORY. This is the type of case in which the differential diagnosis must be begun all over again when the facts of the post mortem examination become available. The latter are easily stated. The kidneys were extremely small, with a combined weight of only 75 gm., and the right kidney was twice the size of the left. Neither the pelves nor the ureters were dilated or showed any evidences of infection, and the prostate was normal in size. The heart was slightly hypertrophied, weighing 375 gm., and there was minimal atheroma of the coronary arteries. The lungs showed massive pulmonary edema. The liver was somewhat inexplicably large, weighing 2360 gm and showing neither passive congestion nor fatty infiltration. Next to the kidneys the most striking organs in the body were the parathyroid glands, all four of which were markedly enlarged and which together weighed 860 mg. Microscopic examination of the parathyroid glands showed marked hyperplasia of the so-called "secondary type," which is characteristically found in patients with very long standing renal insufficiency. One could wish that certain other laboratory examinations had been performed, but we can predict confidently that the serum calcium would have been found somewhat low, the serum phosphorus considerably elevated and in all probability the serum phosphatase also increased. Microscopic examination of sections from the bones shows slight but definite evidence of parathyroid activity, with both bone destruction and bone formation increased in amount and a few minute areas of fibrous replacement of the marrow. The process, however, was probably not extensive enough to have been visualized by x-ray examination. I know of no way in which to recognize a beri-beri heart post mortem. So I must leave that question unsettled. I can only say that there was no morphological evidence of myocardial edema.

The crux of the diagnosis rests in the attempt to identify the underlying renal pathology. A

few years ago the lesions in the kidneys would almost unquestionably have been diagnosed without much hesitation as being due to chronic glomerular nephritis. In the interval Longcope and Winklerwerder¹ and Weiss and Parker² have called our attention to the frequency of healed pyelonephritis. Longcope particularly emphasized the frequency with which it was responsible for very prolonged renal insufficiency and noticed that certain of the cases never developed hypertension. Parker and Weiss, in contrast, have emphasized the role of chronic pyelonephritis in producing a clinical picture indistinguishable from that of malignant hypertension. The latter authors have described in detail the criteria for the histologic recognition of this lesion. Factors such as a deformity of the pelvis, inflammatory infiltration beneath the pelvic epithelium, marked inflammatory infiltration throughout the renal parenchyma, focal wedge shaped areas of scarring, disproportionate destruction of tubules as compared with that of glomeruli, periglomerular fibrosis and the formation within the tubules of a peculiar type of dense hyaline casts suggesting the colloid of the thyroid gland are all points in favor of a chronic pyelonephritis. I have tried hard to fit this case into that category, since its clinical course is so atypical for that of a glomeru-

lar nephritis. However, I do not seem to be able to do so. The difference in size of the two kidneys and a very diffuse inflammatory infiltration throughout the parenchyma seem to be points suggestive of a pyelonephritis. In contrast, however, there was no pelvic deformity on either side, and no inflammatory infiltration immediately beneath the pelvic epithelium. The glomeruli seemed to be more extensively involved than were the tubules, and although many casts were present, only a few of them were convincingly of the colloid type. The glomeruli themselves, moreover, although free from active inflammatory changes, showed unusual numbers of capsular adhesions, and even in the best-preserved areas some degree of fibrosis was present in almost every glomerular tuft. I feel forced, therefore, to make a diagnosis of chronic glomerular nephritis rather than one of pyelonephritis, despite the very unusual clinical course. It is interesting, in view of the absence of hypertension, that the arteries and arterioles within the kidneys showed only slight intimal fibrosis and no necrotizing arteriolitis.

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LAST CALL

THE annual meeting of the Massachusetts Medical Society on Tuesday and Wednesday, May 21 and 22, deserves a record attendance because of the comprehensiveness and the excellent co-ordination of the program. The latest views on a larger number of medical subjects will be presented by specialists in each field. Because of careful planning this will be accomplished in two days. There is no competition in subjects, except at the round-table meetings and luncheons, owing to the abandonment of the scheme of presentation of papers by sections.

The notable list of guest speakers appearing on the program offers a unique opportunity of hearing authoritative opinions on certain new developments and controversial questions. Surgeon-General Thomas Parran will discuss syphilis, Dr

Perrin H. Long, sulfanilamide and allied compounds, Dr Francis G. Blake, pneumonia, and Dr Reed Nesbit, the various methods of treating prostatic obstruction. Dr Esmond R. Long and Dr Edith Lincoln will describe the present views on the pathogenesis and management of adult and childhood tuberculosis. Dr Wilson G. Smilie, a former member of the Society, will consider various aspects of the common cold. Equally qualified men in their fields who are members of the Society will discuss many other important topics, such as breast tumors, pulmonary infections, toxic manifestations of important drugs, urinary-tract infections, streptococcal infections of the respiratory tract, gonorrheal arthritis, syphilis in many of its manifestations and so forth. In addition there are many interesting and instructive scientific and commercial exhibits.

It is unquestionably true that one will be well repaid for spending these two days at the Copley Plaza Hotel.

THE BOSTON MEDICAL LIBRARY A COMMUNITY INTEREST

THE annual report of the librarian of the Boston Medical Library for 1939, appearing in this issue of the *Journal*, again calls attention to the usefulness of this old institution in the community. Ten thousand persons used the library in the course of the year, an unusually large number when one thinks of the specialized nature of the collection and the other opportunities to read and look up references in the medical literature. Although many hospitals and the medical schools in Boston and its vicinity have working libraries, it would seem that the demand for a large, central library, with resources greater than those of other groups, is ever-present. That this demand is met by the Boston Medical Library appears clear from the report.

The ten thousand persons using the library in a year consisted of members, visiting scholars, students from many schools and the public. The library must, by reason of the article of its incorporation and because of its obligations to other institutions, be open to the public, although no

support, other than tax-exemption, is obtained from public funds. To the layman, therefore, the library is a source of medical information. With the widening interest of the public in medical matters, the importance of this provision becomes more and more evident, and although the collection is designed primarily for doctors and medical students, the use of it by the public is wisely not discouraged.

The library, moreover, maintains a large file of current medical periodicals, many of which are not available elsewhere in Boston, an unusual number of bound magazines, going back to the earliest days of medical literature, the current text books and monographs, an unrivaled collection of incunabula, and thousands of medical dissertations, general historical material and Americana. Built up through years of selective acquisition, no library in the country holds a finer or more useful collection based on the needs of the community that it serves.

That the purposes and aims of the Boston Medical Library are recognized is well attested by the growing membership and the increased use of the material on its shelves. The library thus maintains its position, as it has in the past, as an integral part of the cultural and scientific life of Boston in the fields of medical research and of the advancement of medical knowledge.

MEDICAL EPONYM

BROCA'S AREA

At the fortieth session of the Société d'anthropologie de Paris, April 18, 1861, Paul Broca (1824-1880), assistant professor of the Paris Faculty of Medicine, made a communication, a summary of which was published in the *Bulletin de la Société d'anthropologie de Paris* (2: 235-238 1861), under the following title: "Perte de la parole, ramolissement chronique et destruction partielle du lobe antérieur gauche du cerveau [Loss of speech chronic softening and partial destruction of the left anterior lobe of the brain]. A portion of the translation follows:

M. Broca at this session, demonstrated the brain of a man fifty-one years of age who had died on his service at the hospital at Bicêtre and who for twenty-one years, had lost the power of speech. The patient

died April 17, 1861. At the autopsy, the dura mater was found to be thickened. The frontal lobe of the left hemisphere was softened throughout the greater part of its extent. The softening had extended posteriorly as far as the ascending convolution of the parietal lobe and downward as far as the marginal convolution of the temporosphenoidal lobe but it was obvious at first sight that the principal seat and origin of the softening had been the medial part of the frontal lobe of the left hemisphere. It seems reasonable to believe that in this actual case the lesion of the frontal lobe was the cause of the loss of speech.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., Secretary
330 Dartmouth Street
Boston

PYELITIS OF PREGNANCY

Mrs. M. E., a thirty year-old para III, was admitted to the hospital on September 3, 1930, in the fifth month of her pregnancy, complaining of right-sided pain, fever, general malaise, dysuria and nocturia.

The family history was essentially negative. The patient's history included three tonsillectomies, frequent cervical adenopathy and several previous cystoscopies. She had had a history of chronic pyelitis for three years. The two previous pregnancies had been normal. Catamenia began at thirteen, were regular with a twenty-eight-day cycle and lasted five days. The last period was April 14, making the expected date of confinement January 21, 1931.

Physical examination showed a well-developed and well-nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. There was definite tenderness over the right kidney. The uterus was enlarged consistent with the period of amenorrhea. Examination of the urine showed large numbers of white blood cells in clumps, no red blood cells and no casts. A culture showed *Bacillus coli*. The temperature varied from normal to 103°F for the first three days, then remained normal.

The treatment was at first supportive and symptomatic, oral urinary antiseptics being given. Then,

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

on September 5, two days after admission, a cystoscopy was performed and the right infected renal pelvis was irrigated with boric acid solution, followed by the instillation of 10 cc. of 2 per cent Mercurochrome. The ureteral catheter was left in place for twenty-four hours. On September 10 another cystoscopy was done, this time with lavage of the left renal pelvis, followed by the instillation of 12 cc of 2 per cent mercurochrome. The acute symptoms had subsided by September 13, and the patient was discharged.

On September 24, the patient was readmitted to the hospital complaining of right-sided pain. There was no fever or other symptoms. The urinary findings were the same. A cystoscopy was done on September 27, and the right renal pelvis was irrigated with boric acid solution and 10 cc of 2 per cent Mercurochrome was instilled. She was discharged September 28.

The patient was followed in the office throughout the remainder of her pregnancy, which passed without recurrence of the pyelitis. She was admitted to the hospital in labor on January 22, 1931, and delivered uneventfully. The urine still showed many white blood cells in clumps, but the temperature remained normal throughout her hospital stay. She was discharged on the seventeenth postpartum day.

Comment. This case illustrates the more modern treatment of pyelitis. For many years the treatment was entirely constitutional and supportive, abetted by urinary disinfectants. Catheterizing ureters, culturing the urine and washing out the pelvis of the kidneys illustrate a recent phase in the intelligent treatment of pyelitis. The culture in this case showed *B. coli*. Many cases that have been subjected to ureteral catheterization and renal lavage have shown marked improvement. Some of these cases, however, go on to definite kidney damage—either an abscessed kidney requiring nephrotomy or a true surgical kidney requiring nephrectomy. The subsequent history of this patient is unknown, but the washing out of the renal pelvis was apparently curative.

ROUND-TABLE MEETINGS AND LUNCHEONS

The following are the completed programs of four of the round-table meetings and luncheons to be held from noon until 2:00 p.m. on Tuesday, May 21, at the annual meeting of the Massachusetts Medical Society. The program of the fifth

meeting—that of the Section of Obstetrics and Gynecology—was published in the May 9 issue of the *Journal*.

Section of Dermatology and Syphilology

STATE SALON, COPLEY PLAZA HOTEL

Chairman Dr C G Lane, Boston.
Secretary Dr J G Downing, Boston

Subject *Manifestations of Skin Disease on Extremities Diseases Usually Localized to the Hands* Dr C G Lane, Boston

Diseases Usually Localized to the Feet Dr W P Boardman, Boston

Diseases Localized to the Lower Legs Dr J G Downing, Boston

Diseases with Manifestations on Extremities as Part of the General Picture Dr G M Crawford, Boston.

Fungous Diseases of the Extremities Dr J H Swartz, Boston

A Study of the Hydrogen Ion Concentration of the Skin of the Hands and Arms I H. Blank, Boston

Surgical Considerations of Dermatoses of the Hands Dr T W Harmer, Boston

Section of Medicine

PRESIDENT'S ROOM, UNIVERSITY CLUB

Chairman Dr C M Jones, Boston
Secretary Dr E C Miller, Worcester

Subject *Toxic Manifestations of Important Drugs.* Speakers Drs Samuel A Levine, C S Keeler, C L. Short, Alexander Marble and C M. Jones, Boston. Followed by a general discussion.

Section of Pediatrics

BALLROOM, WESTMINSTER HOTEL

Chairman Dr C F McKhann, Boston.
Secretary Dr J M Baty, Boston

Subject *Allergy in Childhood* Speakers Drs. L W Hill, H N Pratt and E. A. Brown, Boston.

Section of Surgery

CRYSTAL ROOM, WESTMINSTER HOTEL

Chairman Dr R. H. Smithwick, Boston
Secretary Dr B C Wheeler, Worcester

Subject *Vitamins and Surgery* Speakers Drs. Cornelius P Rhoads, New York City, and C. C. Lund and A W Allen, Boston. Followed by a general discussion.

All those who are planning to attend the round table luncheons and meetings should get their tickets at the Registration Desk as early as possible on Tuesday morning in order that proper accommodations can be provided. Tickets for all luncheons are \$1.00.

THE SCHOOL CHILD*

When a child begins to go to school he enters on a phase of his life quite different in many respects from the years which have gone before. Until this time his activities have been associated almost entirely with the home, and through the home have come the influences guiding his physical and mental growth and development. From his first day at school and increasingly as he grows older he is surrounded by a new physical environment and is subjected to the influence of teachers and other individuals not connected with his home. His life becomes bound up with the educational system. This change requires many adjustments, some of which must be made at once and others more gradually as he progresses from grade to grade. I cannot discuss at this time the educational aspects of the school child but must confine myself to the effect which the new contacts have on his health.

The basic health needs of the child are the same at every age period, but some of them call for special emphasis during the school years. The school should offer to the child every opportunity to attain the optimum condition of health and should protect him so far as possible from the hazards which act unfavorably on health. Let us consider a few of the situations in relation to school life which have a direct bearing on health.

In order to grow and develop normally every child needs the proper food. The school may make its contribution in this particular by supplying a well-balanced meal for those children who do not go home for lunch. The preparation and serving of the lunch may also furnish an opportunity to instruct the child in food values and in desirable food habits. It may supply a practical demonstration of the formal instruction in the school-room. How many of you who are listening know about the lunch which your child eats at school? If he buys the food, does he spend his money for sweets and cold drinks or for nourishing food and milk? What is the choice offered him? Is someone trying to make a profit on the school lunch or is the food supplied at cost and selected for its food value? Parents might well interest themselves in these matters.

Every child should be given good care for his own body. In the early years this is done for him but, as he advances in age, he must learn to assume this responsibility for himself. The school may render real assistance, not only through specific instruction but through practical demonstration. Physical education and athletic departments have been established for this purpose. Are they being conducted in your child's school so that every pupil is learning the proper use of his body and the easy co-ordination of his muscles? Is the sports program conceived for the benefit of the whole school group or for the potentially successful athlete? Is proper consideration being given to the age of your child, or is his physical activity too advanced for his bodily development? Do the skills which he is acquiring have any relation to future values, and do they meet present needs? These are questions which parents might investigate.

The alternation of work and relaxation is essential to a healthy life. Do you know what your child's daily school schedule is? If his progress in studies is satisfactory you probably have not looked into the matter. If he is having a hard time with his lessons, do you know whether he is being pushed too hard with work at school or is spending too much time in other interests? I have said

be" in all references to the school child merely for convenience of expression, but the questions raised are just as pertinent to the girl as to the boy. Her school schedule needs an equal and intelligent scrutiny. She has the same academic requirements in studies, and she needs the same relaxation in her recreational program.

Right here one ought to ask what the child does out of school hours. Attention has been called to the fact that a large part of the child's time is spent under the influence and direction of the school but the rest of the time is, theoretically at least, under the control of the parents. I say "theoretically" because in many instances the child is left to his or her own devices and the result may or may not be satisfactory from the point of view of health. We must remember that the child's life is a unit work and play must each have its proper place in the whole day's program and neither carried on to excess. Outside activities—parties, extra lessons, additional exercises—need to be considered in relation to the school schedule and used to supplement that schedule not to add a further load in a field which may be overburdened already. These matters are up to the parents. When one studies the daily routine of some children one is impressed with the fact that they have no free time—every hour of the day is filled with an engagement, so carefully planned that an appointment system is necessary. Some of these activities are desirable and furnish pleasure and relaxation to the child others however are unnecessary and should be eliminated. Every child should have some time each day when he does what he wants to do without the pressure of outside domination. This can be accomplished only through thoughtful planning. The school must co-operate by not requiring homework for children under twelve years of age and by expecting only a reasonable amount of homework from older children.

Parents may make another contribution to the child's health by planning the right kind of week ends. Monday morning should find the child rested and anxious for the school week yet the reverse is often the case. Every school principal will tell you that many children start the week more weary than they were on Friday night. Is your family week end planned for the benefit of the children or the adults? This is worth careful consideration.

Parents must assume full responsibility for one aspect of the child's life, that of ensuring an adequate amount of rest and sleep. There is some variation in the sleep requirements of different children but it is safe to say that no child is in danger of getting too much sleep. The fact is that few children get enough sleep. Fatigue is an important factor in causing ill health, and fatigue in children dependent on lack of sleep is the background on which many troubles of the body and mind may develop. This is the time of year particularly when children are most likely to show the effects of too strenuous a program and too little rest. The short days with a relatively small amount of sunlight the confinement indoors during most of the day the pressure of competitive school life, the piling up of extra scheduled activities, all combine to produce fatigue and nervous tension. It is essential that sleep be adequate if health is to be maintained.

I have spoken thus far almost entirely of bodily health but healthy minds are important also. One sometimes forgets how many new or different situations are presented to the child during school life. He must learn to recognize a constituted authority other than that of his parents, to act in harmony with a group whether in work or play to recognize an ultimate goal and be will

*Green Light to Health broadcast given by Dr. Richard M. Smith, on February 24, 1940, and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

ing to work hard to attain it, to subordinate immediate pleasure for a future, more enduring satisfaction. In short, he must learn to live in a world of people—to become a part of that world and to make his contribution to its well-being. If the training by his parents during the preschool years has been good, these adjustments come naturally and without conflict, but if the early training has been faulty, school life may present many difficulties. The child who is doing badly in school may be having too hard lessons or too many outside activities, as has been suggested, but the explanation is quite as likely to be found in some emotional disturbance—he may feel himself out of place and misunderstood. The co-operation of the parents with the school is essential for a happy solution. The child who learns to live well with his school companions is started on an orderly and a useful life. The child who leaves school maladjusted to his environment begins life in the world with a handicap to be overcome, often with great difficulty.

* * *

Q Dr Smith, you have not said anything about the diseases which children often catch at school.

A. I am glad you mentioned that point. Children often do get diseases, especially colds, from contact with other children at school. Parents can be of real assistance in solving this problem. If every mother would be scrupulously conscientious about keeping her own child away from school when he had a cold, the source of infection would be eliminated. It is a strange observation that many mothers who are critical of a school situation where their own children are exposed to a cold are careless about sending their children with colds to school. It does not seem to be appreciated that one's own child may give a cold as well as get one.

Q You spoke about the need for an adequate amount of sleep. Will you not say a little more about that subject.

A. Yes, I am glad to emphasize again the importance of rest and sleep. There are many temptations for the child to stay up late at night. Today the radio is perhaps the thing most often to blame, some programs, popular with the young child, come at an hour after he should be in bed and asleep. Some programs are so exciting that when they are finished sleep is impossible. I do not know of any way to meet this difficulty except to avoid these programs. But, if the mothers of the country acted together, something really constructive could be accomplished. Such united action is necessary, also, if the neighborhood bedtime is to be early enough for children to receive the hours of rest which they need.

Q Is it not difficult to consider the child's whole daily program when the responsibility for his time is partly that of the school and partly that of the parents?

A. No, it is not difficult, but it does take thoughtful consideration. It requires sympathetic co-operation. The parents must know what the child's program is, and the school must know the individual capacities of the child. Both parents and school authorities may have to make adjustments in preconceived ideas to meet the circumstances. Each needs the help of the other. The child is the important person to be considered. It is worth making the necessary effort to maintain and improve his health.

DEATHS

HEWITT—WILLIAM O. HEWITT, M.D., of Attleboro, died April 27. He was in his sixty-fourth year.

Dr Hewitt received his degree in 1900 from Harvard Medical School. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

O'BRIEN—WALTER J. L. O'BRIEN, M.D., of Jamaica Plain, died May 1. He was in his sixty-seventh year.

Born in South Boston, he attended Boston Latin School and Harvard University. He received his degree from Harvard Medical School in 1898, and served his internship at the Rotunda Hospital, Dublin.

Dr O'Brien was a fellow of the Massachusetts Medical Society and the American Medical Association and was a member of the West Roxbury Medical Society.

His widow and a cousin survive him.

PECK—MARTIN W. PECK, M.D., of Boston, died May 7. He was in his sixty-first year.

Born in Montpelier, Vermont, he attended Dartmouth College and received his degree from Harvard Medical School in 1915. For two years following his graduation he was assistant physician at Devereux Mansion, Marblehead, and from 1919 to 1921 was assistant physician at the Sheppard Pratt Hospital in Townsend, Maryland. He was resident physician at the Boston Psychopathic Hospital the following year, and chief of the outpatient department from 1922 to 1926. Dr Peck was instructor in psychiatry at the Harvard Medical School from 1923 to 1937 and assistant psychiatrist at the Massachusetts General Hospital.

Among his affiliations were memberships in the Massachusetts Medical Society, the American Medical Association, the American Psychoanalytic Association, the American Psychiatric Association and the New England Society of Psychiatry.

His widow survives him.

WRIGHT—WILLIAM F. WRIGHT, M.D., of Portsmouth, Rhode Island, died April 11. He was in his sixtieth year.

Born in Fall River, he received his degree from Baltimore Medical College in 1908. Dr Wright practiced in Fall River before moving to Portsmouth, Rhode Island, in 1930. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

MISCELLANY

INTESTINAL TUBERCULOSIS

Hippocrates noted that there is an association between pulmonary and intestinal tuberculosis. But even to the present day the exact relation of pulmonary to intestinal tuberculosis has remained obscure. Light is shed on the subject by correlating the clinical with the pathological findings, as was done at Sea View Hospital where more than 1000 cases of tuberculosis were autopsied. A summary of the article describing the study (Cullen, J. H. Intestinal Tuberculosis. A clinical pathological study. *Quart Bull Sea View Hosp* 5:143-160, 1940), together with brief comments, follows.

1. A study of 1043 autopsied cases of tuberculosis is presented with an incidence of 734 cases, or 70.4 per cent, of intestinal tuberculosis.

The study included all cases of tuberculosis, both pulmonary and extra pulmonary which were ascertained during a five-year period, 1934 to 1938.

2. Intestinal tuberculosis is less extensive and less frequent above the age of forty

The greatest number of cases occurred between the ages of twenty and thirty-four years—76 per cent in this age group showed intestinal involvement. When cases of intestinal tuberculosis are divided according to the extent of intestinal involvement, it is found that in the older age groups, intestinal tuberculosis, when present, tends to be less extensive. The lower incidence and extent of intestinal tuberculosis in the older age group have never been satisfactorily explained.

3. Intestinal tuberculosis is more extensive and frequent in women and in Negroes than in men and Whites.

In the material studied, there were about twice as many men as women, and among them the incidence of intestinal tuberculosis was 4.6 per cent in the women and 6.2 per cent in the men.
The incidence in Whites was 66.4 per cent; Negroes, 77.3 per cent.

4. Although caseous pneumonic tuberculosis is the type of pulmonary disease most frequently associated with intestinal tuberculosis the cases with acute miliary tuberculosis showed a surprisingly high incidence (63.8 per cent) of intestinal involvement.

Most workers believe that direct contact of the tubercle bacilli with the mucosa of the intestinal mucosa is the most important single factor in producing intestinal tuberculosis. A few believe that hematogenous dissemination is the chief method. With that in mind, the cases studied were divided according to the character of their pulmonary disease.

The high incidence in acute miliary tuberculosis seems to indicate that the hematogenous route of intestinal involvement is much commoner than is generally supposed. One is also led to suspect that the bacilli-taken up in the blood are often only modified in the extent and site of the intestinal ulcer and is not itself the cause of intestinal tuberculosis.

5. The incidence of caseous mesenteric lymph nodes and miliary foci in the liver and spleen increases with the severity of intestinal tuberculosis.

Caseous mesenteric lymph nodes were found in 43 per cent of the cases and miliary foci in the liver (49.4 per cent) and spleen (47.8 per cent) in intestinal tuberculosis. It is considered that only routine sections were taken—more careful search would probably have yielded a higher incidence.

6. Intestinal tuberculosis is most frequent in the ileocecal region.

In this series of 734 cases of intestinal tuberculosis the ileum was involved in 652 and the cecum in 535. Extension of the tuberculous process is more frequently situated toward the stomach, which was involved in only 4 cases. The small intestine was involved alone more frequently than was the large intestine.

The character of the intestinal lesions varies just as in tuberculosis of other parts of the body. The earliest lesions are the lymphoid nodules of the submucosa, principally in Peyer's patches. The area of caseation finally involves the mucosa and ulceration results. The healing process consists of fibrosis of the specific tubercles followed by epithelial regeneration. The necrotic material sloughs out and the contraction of the fibrous tissue tends to approximate the edges of the ulcer. The unsloughed epithelial cells at the border of the ulcer creep in and finally cover the floor of the ulcer.

7. Perforation of a tuberculous ulcer occurred in 28, or 3.81 per cent, of the cases with intestinal tuberculosis. It occurred most frequently in the ileum.

Perforation caused a generalized peritonitis in 10 cases, a localized peritonitis in 16 cases. Three perforations were extraperitoneal. Two ulcers in the ileum penetrated into the pericolic tissues and once an ulcer in the cecum penetrated retroperitoneally. Perforation occurred most often in the ileum and least often in the appendix.

8. Generalized tuberculous peritonitis, except in those cases due to perforation of a tuberculous ulcer is not related to intestinal tuberculosis.

Tuberculous peritonitis not associated with intestinal tuberculosis, occurred in 52 cases.

9. The incidence and severity of intestinal tuberculosis are much less in those cases which have had pulmonary symptoms one to two years.

The frequency of intestinal tuberculosis is listed in the duration of the pulmonary disease. The highest incidence of intestinal tuberculosis occurs in cases with pulmonary symptoms of one year to twenty-three months' duration before death. As the duration of pulmonary symptoms increases the incidence and severity of intestinal tuberculosis decrease. Just why cases of long duration should not develop intestinal tuberculosis in spite of persistently positive sputum is not known.

10. The incidence and severity of intestinal tuberculosis are directly related to the positivity of the sputum.

The frequency and severity of intestinal tuberculosis were correlated with the degree of positivity of the sputum. Except for those cases which were positive on concentration only the incidence and extent of intestinal tuberculosis increase as the number of tubercle bacilli in the sputum increases. Cases that had a mean Gaffky count of VII X had an incidence of 1.83 per cent intestinal involvement. Cases that were negative on concentration had a incidence of 40.4 per cent.

11. The symptoms of intestinal tuberculosis are frequently misleading and are often present in cases with out any intestinal involvement.

Symptoms and signs may be bizarre, slight and easily overlooked. Symptoms became more frequent as the severity of intestinal involvement increased.

12. The diagnosis of intestinal tuberculosis based on roentgenograms was inaccurate in 29.2 per cent of the 113 cases studied roentgenographically and at postmortem.

Another writer found the intestinal x-ray unreliable in 52 per cent of his a series of 67 cases. The x-ray fails to substantiate many cases diagnosed as intestinal tuberculosis on x-ray. It is admitted that pseudo filling defects seen on x-ray may have been misinterpreted as evidence of organic disease, since fluoroscopy as recommended by Brown and Sampson was not done.

The other factor that accounts for some of the disagreement found between x-ray and autopsy is the fact that the x-ray criteria of tuberculosis of the ileum—distention, segmentation and stasis—are not so accurate as the criteria for diagnosis in the rectum and colon.

Reprinted from *Tuberculosis Abstracts* May 1940

NOTES

Forty-four appointments to the teaching and research staff of the Harvard Medical School effective at the beginning of the next academic year were recently announced by the University as follows: Emanuel B. Schoenback, M.D. Harvard 37 now at Harvard Medical School instructor in bacteriology; Alan C. Batchelder, Ph.D. University of California 39, now at Johns Hopkins Hospital research fellow in physical chemistry; Maurice M. Tolman, M.D. Harvard 27 of Boston, assistant in dermatology; Edwin V. Hill, M.D. Tufts 39 now at Massachusetts Memorial Hospitals, research fellow in legal medicine; Charles H. Burnett, M.D. University of Colorado 37 now at Boston City Hospital assistant in medicine; John H. Dingle, M.D. Harvard 39 now at Children's Hospital, Boston assistant in medicine; Herman Erlanger, M.D. Washington University 37 now at University Hospital Ann Arbor Michigan, assistant in medicine; Robert S. Evans, M.D. Harvard University 38 now at Boston City Hospital assistant in medicine; William Parson, M.D. Columbia University 37 now at Massachusetts General Hospital, assistant in medicine; Conger Williams, M.D. McGill University 37 now at Massachusetts General Hospital, assistant in medicine; William P. Chapman, M.D. McGill University 38, now at Massachusetts General Hospital; Henry P. Walcott, Fellow in Clinical Medicine; Arthur M. Bassett, M.D. University of California 38 now at University of California Medical School, San Francisco, research fellow in medicine; Henry H. Brewster, M.D. Harvard University 38 now at Boston City Hospital research fellow in medicine; Joseph H. Burchenal, M.D. University of Pennsylvania 37 now at Boston City Hospital, research fellow in medicine; Richard V. Ebert, M.D. University of Chicago 37 now at Peter Bent Brigham Hospital, research fellow in medicine; Alfred F. Goggio, M.D. University of Toronto 38 now at St. Michael's Hospital Toronto, Canada, research fellow in medicine; Marlow B. Harrison, M.D. Harvard 36 of San Francisco, research fellow in medicine; Sibley W. Hoobler, M.D. Johns Hopkins 38 now at University Hospital Ann Arbor Michigan, research fellow in medicine; John W. Howard, M.D. University of Pennsylvania 36, now at Pondville Hospital, Wrentham, Massachusetts research

fellow in medicine, David A. Karnofsky, M.D. Stanford University '40, now at Stanford University Hospital, research fellow in medicine, Osler L. Peterson, M.D. University of Minnesota '39, now at University of Minnesota Hospitals, research fellow in medicine, James L. Whittenberger, M.D. University of Chicago '38, now at Department of Surgery, University of Chicago, research fellow in medicine, Daniel W. Badal, M.D. Western Reserve University '37, now at Boston Psychopathic Hospital, assistant in neurology, Richard B. Pippitt, M.D. Harvard '37, now at Massachusetts General Hospital, assistant in neurology, Lazarus Secunda, M.D. Columbia University '36, now at Boston Psychopathic Hospital, assistant in psychiatry, Robert H. Barker, M.D. Harvard University '34, of Boston, assistant in obstetrics, Otto E. Aufranc, M.D. Harvard '34, of Boston, assistant in orthopedic surgery, John A. Reidy, M.D. Harvard '34, of Boston, assistant in orthopedic surgery, Oscar S. Staples, M.D. Harvard '35, of Boston, assistant in orthopedic surgery, Charlotte L. Maddock, M.D. Boston University '29, now at Children's Hospital, Boston, research fellow in pediatrics, Donald L. E. Thurston, M.D. Vanderbilt University '37, now at Children's Hospital, Boston, assistant in pediatrics, Ernest M. Worden, M.D. University of Toronto '36, now at Children's Hospital, Boston, assistant in pediatrics, Walter R. MacLaren, M.D. Harvard '38, now at Massachusetts General Hospital, research fellow in pediatrics, Hudson Hoagland, Ph.D. Harvard '27, now at Department of Physiology, Clark University, research associate in physiology, Edward S. Lee, Jr., M.D. Meharry Medical College '37, now at Meharry Medical College, Nashville, Tennessee, research fellow in physiology, Hanns C. Schwyzer, M.D. University of Minnesota '39, of St. Paul, Minnesota, research fellow in physiology, James H. Wills, S.M. Medical College of Virginia '36, now at University of Rochester School of Medicine, research fellow in physiology, John R. Mote, M.D. Harvard '35, of Cambridge, Massachusetts, assistant in preventive medicine and epidemiology, Albert J. Sheldon, S.D. Johns Hopkins '37, now at Division of Public Health, University of North Carolina, Charles Follen Folsom, Fellow in Preventive Medicine, Dwight E. Harken, M.D. Harvard '36, of Osceola, Iowa, assistant in surgery, Stanley O. Hoerr, M.D. Harvard '36, now at Peter Bent Brigham Hospital, assistant in surgery, Robert R. White, M.D. University of Rochester '37, now at Peter Bent Brigham Hospital, assistant in surgery, Charles L. Dummier, Jr., M.D. Harvard '38, now at Peter Bent Brigham Hospital, assistant in surgery, and Horace E. Campbell, S.B. University of Nebraska '25, now at Harvard Medical School, research fellow in surgery.

The New England Society of Psychiatry held its annual meeting at Danvers State Hospital, Hathorne, on April 25. The following were elected to office: president, Dr. Roy D. Halloran, Waltham, Massachusetts; vice-president, Dr. George E. McPherson, Belchertown, Massachusetts; secretary-treasurer, Dr. Bardwell H. Flower, Boston; councilors, Dr. Charles H. Dolloff, Concord, New Hampshire, and Dr. George A. Elliott, Middletown, Connecticut.

CORRESPONDENCE

GERIATRICS

To the Editor Your editorial, "Geriatrics," in the April 18 issue is particularly interesting to us here because the term, "geriatrics," was coined by one of our graduates, Dr. I. L. Nascher, of the class of 1885. And it is for this reason as well as for purposes of accuracy, that we call your attention to the following:

In 1928, the entire Annual Graduate Fortnight at the New York Academy of Medicine was given over to the topic, "Problems of Aging and of the Old," and you will find an account of the sessions in *Bulletin of the New York Academy of Medicine*. In *Annals of Medical History* (NS 10:324-335, 1938) you will find a paper by J. T. Freeman on "The History of Geriatrics." On page 333, reference is made to Dr. Nascher and his coining of the word, geriatrics. Dr. Nascher himself has written a book, *Geriatrics* (Philadelphia: P. Blakiston's Son & Co., 1914).

You may be interested to know that Dr. Nascher is still living and is working on Staten Island.

HELEN BAYNE, *Librarian*,
New York University College of Medicine.

477 First Avenue,
New York, New York

ARTICLES ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY, AMERICAN MEDICAL ASSOCIATION

To the Editor In addition to the articles enumerated in our recent letter the following have been accepted:

Abbott Laboratories

Ampules Ephedrine Sulfate—Abbott, 0.025 gm. ($\frac{3}{8}$ gr.), 1 cc.

Ampules Gold Sodium Thiosulfate—Abbott, 0.075 gm.

Lakeside Laboratories, Inc.

Ampules Caffeine with Sodium Benzoate—Lakeside, 0.24 gm. ($3\frac{3}{4}$ gr.), 2 cc.

Ampules Caffeine with Sodium Benzoate—Lakeside, 0.49 gm. ($7\frac{1}{2}$ gr.), 2 cc.

E. S. Miller Laboratories, Inc.

Compressed Tablets Sulfanilamide—Miller, 5 gr.

Sharp and Dohme

Elixir Propadrine Hydrochloride

E. R. Squibb and Sons

Amniotin in Oil, 5000 international units

Ephedrine Alkaloid—Squibb

Ephedrine Compound Inhalant—Squibb

Ephedrine Inhalant Plain—Squibb

Ephedrine Sulfate—Squibb

Capsules Ephedrine Sulfate—Squibb, $\frac{3}{8}$ gr.

Capsules Ephedrine Sulfate—Squibb, $\frac{3}{4}$ gr.

Tablets Thiamin Chloride—Squibb, 10 mg.

Tablets Thiamin Chloride—Squibb, 3 mg.

Thiamin Chloride Solution, 5 cc., 10 mg.

Thiamin Chloride Solution, 5 cc., 25 mg.

Thiamin Chloride Solution, 5 cc., 50 mg.

Thiamin Chloride Solution, 10 cc., 10 mg.

White Laboratories, Inc.

White's Thiamin Chloride Tablets, 1 mg.

PAUL NICHOLAS LEECH, *Secretary*

535 North Dearborn Street,
Chicago, Illinois

REPORTS OF MEETINGS

SUFFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Suffolk District Medical Society, held at the Boston Medical Library on January 31, was devoted to papers presented by the staff of the Children's Hospital.

The first speaker was Dr James L. Gamble, and his subject "Certain Features of the Water and Salt Exchange." It was pointed out that the kidney mechanism for the maintenance of fluid balance and ionic equilibrium is a slowly acting one, whereas the transfer of water across the cellular barriers is a rapid one which temporarily compensates for osmotic changes. The interstitial fluid, which amounts to three quarters of the extracellular fluid affords an excellent buffer for these changes and is consequently of variable volume.

Experiments on the sodium balance showed that there is an extreme variation in the urinary excretion of sodium while the intracellular ions are removed in essentially constant amounts. These measurements were interpreted as indicating a considerable fluctuation of the volume of extracellular fluid even under quite normal circumstances.

Dr Louis K. Diamond presented the second paper on "Variability of the Clinical and Hematological Manifestations of Leukemia in Childhood." It was suggested that the bizarre presenting symptoms and subsequent course of these conditions in children make untenable the former classifications by the type and number of cells alone. The classic clinical picture of leukemia is often a late manifestation in this age group whereas the chief complaint at onset may be pallor, easy bruising, bleeding from the alimentary tract, pain in the joints or abdomen, or merely anorexia and loss of weight. Consequently Dr Diamond recommended a reclassification by the clinician in addition to the hematologist, who not infrequently cannot properly classify the disease by its cytology alone.

As further support for his proposal, the speaker cited various animal experiments which have substantiated the claim that the leukemias are divisible into clinical groups. Heredity as an etiologic factor does not play the dominant role in human leukemia that it does in inbred mice. The report of familial cases, however, does seem to indicate some hereditary tendencies. A very important feature of leukemia in mice produced experimentally by inoculation is that living cells must always be transmitted, and it is these rather than the host cells which progress malignantly. Furthermore, the course and characteristics of the disease in such animals can be moderately well predicted by knowing the cell type, the manner and site of injection, and the condition of the host (infection previous roentgen therapy and so forth).

Dr Diamond concluded that experimental and human spontaneous leukemia have much in common and suggested, therefore, that the human disease may be considered to be a malignant process, that heredity plays a minor etiologic role in the spontaneous disease, and that a careful history and observation of the onset and course enables one to place most cases in several large categories similar to those proposed for the disease in mice.

Of 150 cases of leukemia observed at the Children's Hospital he was able to distinguish ten distinct groups of 6 to 12 cases each. Examples of four of these groups were given. In the first group were cases with only slight enlargement of the lymph nodes and spleen but with bleeding and anemia as outstanding manifestations. There were a rapid fatal course, a marked leukocytosis and a diffuse infiltration of all tissues with leukemic cells at autopsy. The patients in the second group had moderate enlargement of the lymph nodes and spleen at first but usually presented themselves because of anemia or abdominal pain. The course was one of rapid increase in size of the spleen and the abdominal nodes, with a high white-cell count and fever. The third type was characterized by an early resemblance to rheumatic fever and by ecchymoses. These children ran a more subacute course and revealed a nor-

mal or low white-cell count, with a few abnormal cells. There might be terminal anemia of an aplastic sort, which was explained by the postmortem finding of diffuse extensive infiltration of the bone marrow. The final major group often had a primary pulmonary complaint and then progressed slowly with moderate anemia and leukocytosis. Autopsy findings were usually marked by diffuse leukemic infiltration particularly in the thoracic cage.

The next speaker was Dr Allan M. Butler who discussed "Apparent Ascorbic Acid Concentrations in Terms of Plasma, Red Cells and White Cells." Dr Butler stated that low plasma ascorbic acid values are not necessarily indicative of deficiency of vitamin C but that high levels do rule out this condition. More accurate information concerning the state of vitamin C nutrition is provided by analyses of whole blood or the buffy layer of centrifuged whole blood.

The most instructive result of the study of the partition of ascorbic acid was that showing high values in the white layers of centrifuged oxalated blood. The ascorbic acid content of the platelets and white cells from patients with leukemia ranged as high as 140 mg per 100 cc. In scurvy the concentration in platelets and white cells dropped to zero. In deficiency states the concentration of ascorbic acid in the platelets and white cells furnishes an index of vitamin C nutrition that extends beyond that provided by plasma values. If a whole-blood analysis is used as an index the blood must be saturated with carbon monoxide before precipitation in order to prevent oxidation of the ascorbic acid and account should be taken of any elevation of the leukocytes due to infection or leukemia.

The final paper of the evening on the "Criteria for Ligation of Patent Ductus Arteriosus in the Light of the First One and a Half Years Experience" by Dr J. P. Hubbard and Dr R. E. Gross was delivered by Dr Hubbard. It was stated that, on the basis of experience up to date, ligation of the ductus has proved of great value and is indicated in carefully selected cases. The diagnostic criteria were briefly reviewed. These consist primarily of the characteristic thrill and murmur. A bulge of the pulmonary cone may or may not be present in children. Confirmatory diagnostic signs, which when present are of great significance in the selection of patients for operation appear if the shunt is large enough to throw an undue burden on the heart and circulation. These signs include pulmonary congestion seen by x-ray peripheral signs of aortic regurgitation and in the child delayed physical development, the latter resulting from impaired systemic circulation. When the circulation is severely overburdened, the usual signs of congestive failure may appear.

The surgical technique developed by Dr Gross consists of a left pleural approach with collapse of the left lung and dissection of the ductus.

Dr Hubbard described the results in the first case. These included the disappearance of murmur and thrill, the return of the blood pressure to normal, gain in weight and so forth. Dr Hubbard pointed out that the incidence of subacute bacterial endocarditis, as given in Dr Maude Abbott's series and more recently in Dr Bullock's series, does not represent the actual chance the patients have of developing this complication. Both these series are of selected cases gathered from the literature. The cases selected by Dr Gross have all presented evidence of an undue strain on the heart. It is to be hoped that these cases will remain free of bacterial endocarditis, but it is appreciated that years of observation will be needed before this latter point can be definitely established.

Of the 9 cases operated on to date by Dr Gross, 1 was associated with other anomalies, there was 1 postoperative death. Seventeen additional cases are known to have been operated on elsewhere throughout the country. Of these there were 2 postoperative fatalities. In the light of present knowledge and experience, ligation of the patent ductus arteriosus in those exhibiting cardiac insufficiency as a complication was recommended as a beneficial and reasonably safe measure.

WILLIAM HARVEY SOCIETY

A regular meeting of the William Harvey Society was held at the Beth Israel Hospital on February 9, with Dr David Rapport presiding. The speaker of the evening was Dr Alfred M. Richards, whose subject was "Kidney Function." Dr Richards reviewed the history of the subject and of his own researches in the field. He also cited the evidence for his theory of the mechanism of kidney function, which, briefly, consists of a filtration through the glomeruli of all non-colloid constituents of plasma and the selective reabsorption of the threshold substances from the tubules.

Other studies of the speaker have proved that the glomerular filtrate is alkaline like plasma rather than acid like urine, and that the urinary flow is proportional to the blood pressure rather than to the blood flow. The latter was demonstrated by perfusing a rabbit's kidney in situ, while maintaining by a pump a constant flow despite changes of renal pressure.

NOTICES

BOSTON CITY HOSPITAL

The next staff clinical meeting of the Boston City Hospital will be held in the Cheever Amphitheater, on Thursday, May 23, at 11 30 a.m.

PROGRAM

Symposium on Vitamins

The Surgical Significance of Vitamin C Dr Charles C Lund.

Vitamin A Deficiency in Man. Dr Harold J Jeghers

Nutritional Polyneuritis Dr Arnold P Mecklenjohn.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, May 22, from 2 to 4 p.m. Drs Robert Zollinger and C. A. Janeway will speak on "Jaundice."

Physicians and students are cordially invited to attend.

MEDICAL LIBRARY ASSOCIATION

The fortysecond annual meeting of the Medical Library Association will be held at the University of Oregon Medical School, Portland, Oregon, on Tuesday, Wednesday and Thursday, June 25-27, under the presidency of Col Harold W Jones, of the Army Medical Library, Washington, District of Columbia. Hotel headquarters will be at the Heathman. The program will include talks on the literature of epidemiology of plague, tularemia and Rocky Mountain spotted fever, a symposium on investigations in local medical history, and problems in bibliography based on a study of terminology in the field of nutrition.

DEDICATION OF OSLER MEMORIAL

The old autopsy house where Osler worked at Blockley has been restored as the Osler Memorial Building, and will be dedicated on the grounds of the Philadelphia General Hospital, at Curie Avenue, near Thirty Fourth and Pine streets, Philadelphia, at 2 p.m. on June 8.

Original furnishings, including the necropsy table, have been collected. The painting by Dean Cornwell, N.A., of New York City, entitled "Osler at Old Blockley," later to be hung in the building, will be on exhibition during the celebration.

There are facilities in the building for the housing and preservation of relics of old Blockley, as well as Osteriana. The committee would welcome any additions to this collection.

A cordial invitation is extended to those who are interested, and especially those who are planning to attend the meeting of the American Medical Association in New York City, June 10 to 14.

AMERICAN CONGRESS OF PHYSICAL THERAPY

The nineteenth annual scientific and clinical session of the American Congress of Physical Therapy will be held September 2-6, at the Hotel Statler, Cleveland, Ohio. Mornings will be devoted to the annual instruction course, and afternoons and evenings to scientific sessions. The seminar and convention proper will be open to physicians and qualified technicians.

For information concerning the seminar and preliminary program of the convention proper, address American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, MAY 19

MONDAY MAY 20

7 p.m. South Boston Medical Society Harvard Club Boston.

TUESDAY MAY 21

*9-10 a.m. Arthritis clinic Dr Walter Bauer Joseph H. Pratt Diagnostic Hospital

WEDNESDAY MAY 22

*9-10 a.m. Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital

*2-4 p.m. Jaundice. Drs Robert Zollinger and C. A. Janeway Peter Bent Brigham Hospital

THURSDAY, MAY 23

*9-10 a.m. Cardiac clinic Drs H Magendantz and A. Zethin. Joseph H Pratt Diagnostic Hospital

11 30 a.m. Boston City Hospital staff clinical meeting

FRIDAY MAY 24

*9-10 a.m. The Origin Diagnosis and Treatment of Primary Biliary Tumors Dr Oscar Hirsch Joseph H Pratt Diagnostic Hospital

SATURDAY MAY 25

*9-10 a.m. Hospital case presentation Dr S J Thannhauser Joseph H Pratt Diagnostic Hospital

*Open to the medical profession.

MAY 21 — St. Francis Hospital (Hartford) alumni. Page 737 issue of April 25

MAY 21 22 — Massachusetts Medical Society Annual Meeting, Copple Plaza Hotel Boston

JUNE 4-6 — National Gastroenterological Association. Page 737, issue of April 25

JUNE 4-7 — American Association of Industrial Physicians and Surgeons. Page 654 issue of April 11

- June 7 8—American Heart Association. P. 469. Issue of March 14.
 June 7-10—American Board of Obstetrics and Gynecology. Page 608, issue of April 4.
 June 8—Dedication of Oster Memorial. Page 662.
 June 8 and 10—American Board of Ophthalmology. Page 719. Issue of November 2.
 June 8-10—American College of Chest Physicians. Page 781. Issue of May 2.
 June 10—American Medical Golfing Association. Page 824. Issue of May 9.
 June 10-14—American Medical Association. Annual meeting. New York City.
 June 10-14—American Physicians' Art Association. Page 332, issue of February 22.
 June 12—Harvard Medical Alumni Association. Page 781. Issue of May 2.
 June 23-25—Maine Medical Association. Annual meeting. Bangor. Maine.
 June 25-27—Medical Library Association. Page 662.
 June 27—Postgraduate Association of Physicians.
 September 2-6—American Congress of Physical Therapy. Page 662.
 October 8-11—American Public Health Association. Page 695. Issue of April 11.
 October 21—American Board of Internal Medicine, Inc. Page 369. Issue of February 29.

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

JUNE 31.

OCTOBER 30.

BOOKS RECEIVED FOR REVIEW

The First Five Years of Life. A guide to the study of the preschool child from the Yale Clinic of Child Development. Arnold Gesell et al. 393 pp. New York and London Harper & Brothers, Publishers, 1940 \$3.50.

Arthritis And allied conditions Bernard I. Connors. 752 pp. Philadelphia Lea & Febiger 1940 \$8.50.

Chemotherapy and Serum Therapy of Pneumonia. Fredenck T. Lord, Elliott S. Robinson and Roderick Heffron. 174 pp. New York The Commonwealth Fund, 1940. \$1.00.

Diabetes. Practical suggestions for doctor and patient. Edward L. Bortz. Second edition. 296 pp. Philadelphia P. A. Davis Co., 1940 \$2.50.

Let's Talk About Your Baby H. Kent Tenney Jr. Second edition. 115 pp. Minneapolis University of Minnesota Press, 1940 \$1.00.

Synopsis of Obstetrics Jennings C. Litzenberg 394 pp. St. Louis C. V. Mosby Co., 1940. \$4.50

Introduction to Medicine Don C. Sutton. 642 pp. St. Louis C. V. Mosby Co., 1940. \$3.25

Juvenile Delinquents Grown Up Sheldon and Eleanor Glueck. 330 pp. New York The Commonwealth Fund, 1940 \$2.50.

Specialties in Medical Practice Edited by Edgar V. N. Allen. 2 loose leaf volumes. 964 pp. New York and Edinburgh Thomas Nelson & Sons, 1940 \$25.00 set.

Principles of Orthopedic Surgery James W. Sever. Third edition. 418 pp. New York The Macmillan Co., 1940 \$3.25

The Diagnosis and Treatment of Diseases of the Peripheral Arteries Saul S. Samuels. Second edition. 372 pp. London, New York and Toronto Oxford University Press, 1940 \$6.50.

An Introduction to Medical Genetics J. A. Fraser Roberts. 266 pp. London and New York Oxford University Press, 1940. \$4.50.

BOOK REVIEWS

The Dysenteric Disorders. The diagnosis and treatment of dysentery sprue colitis and other diarrhoeas in general practice Philip Manson-Bahr. 613 pp. Baltimore William Wood & Co. 1939 \$8.00

This volume is based largely on the author's experience of thirty years of practice and study in the Orient and in London. The subject matter covers a wide range of conditions including bacillary and amebic dysentery Asiatic cholera celiac disease and some of the helminthic infections. The author thoroughly versed in his field, may have underestimated the difficulties confronting less experienced men who would value a full expression of personal opinions and preferences.

In general the therapy of these various disorders is presented from the standpoint of embracing all points of view. For the treatment of amebic dysentery preference is given to emetine or its modifications and to yatein, although fifteen or more drugs and other substances are considered. Among those relegated to a rank of lesser importance is carbarsone, although the effectiveness of this drug has been demonstrated to the satisfaction of American physicians.

Full consideration is given to various procedures for treating Asiatic cholera. Intestinal disinfection at best a difficult undertaking, is included as one of the important principles in its treatment.

The author considers that the literature contains a welter of conflicting views concerning the etiology of sprue. He presents the conception that the true etiology is a specific virus affecting the intestinal mucous membrane, this interpretation being based on clinical observations. In treatment, considerable emphasis is placed on the difficulties encountered in selecting a suitable diet from the many which have been recommended. Liver soup in small daily amounts is included in one set of diets, and liver extract is added to some of the high-protein diets, using the equivalent of five eighths of a pound of liver daily. Among the many pages devoted to the dietary treatment of sprue, the reader should direct his attention to the paragraph concerning the parenteral administration of liver extract.

Schistosomiasis appears under the designation of bilharziasis and is accompanied by an inaccurate consideration of dates that are essential.

The appendices, enriched by some excellent illustrations, describe clearly some of the important protozoa and bacteria and the laboratory procedures which are useful in diagnosis. An extensive bibliography is presented, but it does not fully solve the difficult problem of well selected representation.

Supervision in Public Health Nursing Violet H. Hodgson. 376 pp. New York The Commonwealth Fund 1939 \$2.50

This book is a set of admirable rules for the proper supervision of public-health nursing. One is not in a position to challenge the validity of Mrs. Hodgson's principles, which are based upon unusual opportunities of observation in what is known as the field. It is the set of the author's mind, the whole unconscious atmosphere pervading the book, which engenders the perverse reaction that perhaps records, the clinic the director case conferences or even public health nursing itself may just conceivably not be among the eternal virtues of life requiring a "philosophy of supervision" (Chapter IV). In this as in any other field where there is a job to be done, it is to

be hoped that a man or woman may be found to do it without the inevitable necessity of such elaborately specific training as is demanded by Mrs. Hodgson.

The volume is replete with diagrams of the type so dear to the heart of the late Dr. Elmer E. Southard—little boxes labeled "board," "assistants to commissioner," "field nurse in charge" and so forth, connected by unmistakable straight and dotted lines. These are clear, specific and well planned, but not very interesting.

The results of Mrs. Hodgson's occasional incursions into the field of semasiology are not happy. "The original meaning of a Staff," she says (page 68), "is something to lean on." This is a good WPA doctrine, but as a matter of fact, the original meaning of "staff" is a cudgel, or a stick which shows its bearer to be a person of authority.

If this book were translated into German, its adherence to the idea of the *Führer Prinzip*—despite its frequent allusions to what the author terms "Democracy"—would be apparent and acceptable. This criticism is not intended necessarily to be derogatory.

Every supervisor of public-health nursing will do well to read and study this manual. If she can bring to her work in addition to Mrs. Hodgson's stern requirements a sense of humor and proportion, she will indeed be worthy of her hire.

Nursing Mental Diseases Harriet Bailey Fourth edition 264 pp New York The Macmillan Co., 1939 \$2.50

This book is meant to be used as a textbook in nursing schools. Miss Bailey is admirably qualified for authorship of such a book by her years of experience in teaching the subject. A graduate of Johns Hopkins School of Nursing, she has been assistant superintendent of nurses at the Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, principal of the Training School for Nurses at the Manhattan State Hospital, New York City, a member of the Department of Medical Information and formerly nursing editor of the *International Journal of Public Health* and director of nursing education at Bellevue and allied hospitals in New York City.

The author has covered the ground of psychiatric nursing thoroughly, each phase of mental illness and disease is painstakingly dealt with, causes are delineated, symptoms discussed, and treatment and nursing care described.

The first chapters deal with the history of the care given the mentally sick from ancient times down to the present day, with its improvements in the understanding of mental ills and their relief, as well as preventive measures of mental hygiene. She also takes up the legal aspects of the subject, giving the legal definition of insanity and explaining the regulations for commitment and other legal procedures touching on mental disease.

From there she goes on to the development of the personality, an understanding of which she believes to be extremely necessary to good psychiatric nursing. This chapter takes up the definitions of such psychological terms as unconscious and subconscious mind, complexes, emotional conflicts, compensation and sublimation.

The book then gives specific causes for mental illness, a general classification of the different disorders and the difference between psychoses and the psychoneuroses, before taking up a detailed account of the symptoms of each of these illnesses.

There is a chapter which discusses the qualification for mental nursing, the handling of patients, the administering and preparation of foods for different types of patients and the care of everyday functions, bedsores, con-

vulsions and the like. There is also one entitled "Dangers and Precautions—Accidents and Emergencies," in which Miss Bailey gives warnings for the dangers to be watched for and circumvented and describes first aid treatment of all kinds, to be given before the doctor arrives.

The main portion of the book is, of course, given over to the description of the different psychoses and psychoneuroses, their symptoms and the treatment and nursing care needed in each. Alcoholism, epilepsy and mental deficiency are included in the list.

The last three chapters describe therapeutic measures, physiotherapy and mental hygiene. There are also a bibliography and a glossary in the back of the book which should prove helpful to student nurses.

Ophthalmology Clio Medica 20 Burton Chance. 240 pp. New York Paul B. Hoeber, Inc., 1939 \$2.00

Chance's book is an outline of the history of ophthalmology. Like other books in the Clio Medica series it is pocket size and inexpensive. It is necessarily brief and conspicuously devoid of lengthy references and annotations. Ophthalmologists, opticians and others interested in ophthalmology's background will find it very readable.

The material in the book is arranged in more or less chronological order and therefore permits either sequential or reference reading. The first chapter describes ophthalmic practice, so far as is known, in the Mesopotamian valley from 2250 B.C. on. Then follow in order similar descriptions of ophthalmology in Egypt, China, Greece and Rome, and a description of ophthalmology in the Arabian, Medieval, and Renaissance periods. The modern period, according to the author, begins with the establishment of the Vienna School in 1773. The second half of the book is devoted to the historical development of our knowledge in regard to individual diseases, phenomena, methods of treatment and particular sociologic aspects of ophthalmology. In bringing the material up to date numerous references are made to persons now living and still actively engaged in molding the historical course of ophthalmology.

Aside from learning many interesting facts, one gets certain general impressions from a survey of this kind. One thus obtains the impression that ophthalmology did not develop as a logical specialization of medicine but rather that it evolved from a sort of quackery and charlatanism. Instances like the founding of the Vienna School by the pupils of Baron Wenzel, an itinerant cataract coucher, are the cornerstones of ophthalmology. The recognition of the specialty as a legitimate and honorable branch of medicine is of relatively recent origin. At a time like the present when further basic changes in the practice of medicine are being contemplated, it is well for all ophthalmologists to have some knowledge of their specialty's history, and this book gives just enough and not too much for the great majority.

Biological Products Louis Gershenfeld. 236 pp New York Romaine Pierson Publishers, Inc., 1939 \$4.00

This is a very valuable little reference work covering all biological products, with detailed descriptions of the manufacture, uses and efficiency of the commoner ones. The author has done an unusually fine job condensing essential information. The pictures are interesting, but seem to the reviewer to add to the expense of publication without adequate return. The book should be extremely useful to the general practitioner.

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NEW ENGLAND, NEUROSURGERY AND THE NEUROSURGEON*

WILLIAM JASON MIXTER M.D.†

BOSTON

MANY authors have written of the beginnings of medicine in New England, and through their writings we find something of the foundation on which medicine in this corner of the United States was built. We read of the minister physician and the barber surgeon in the early days of our colony. The minister physicians were among the leading men of their respective communities. Theirs was no easy job. They had souls to save as well as lives. Let us not cavil if their theology breathed of hell fire and brimstone and if the purge was the most frequently employed form of medication. What if they did "breathe a vein" for almost any ailment, and what if the barber surgeon did use all sorts of curious and revolting things for dressings? Those were the days of angleworm oil, of nanny tea and other archaic medicaments. Some benighted peoples still use curious forms of treatment. Bear's gall bladders not many years ago had a ready sale to the Chinese doctors of the Pacific Coast. We can say "Oh, yes, the Chinese"—but we had quaint customs here at home. I can remember removing a poultice from a caruncle in my early days—an amateur poultice to be sure. It was offensive to the nose and to the eye and proved to be a large chew of tobacco.

These early members of our fraternity had learned their medicine in England, but when they came to America they left behind much of the quackery and charlatanism that was rife in England during the fifteenth and sixteenth centuries. Remember that this was a new country and that life was cheap and the way of life was hard. They were pioneers and they cut out the nonessentials.

We read of starvation of Indian raids, of the various epidemics that decimated the colonies. The worst of their plagues was smallpox, that dread scourge, that stalked through the settlements in more deadly fashion than an Indian war party. Smallpox took its toll of lives time after time

until Zabdiel Boylston, about 1720, read or heard of direct inoculation with smallpox material. He must have been a courageous man, this Boston physician, for he decided to use this new and almost untried method of disease prevention. Many powdered heads were shaken in disapproval but the experiment was a success. It is an interesting fact that his records of these cases were excellent. His statistics proved the value of inoculation, and his work was accepted here and abroad.

During these years from the establishment of the colonies to Zabdiel Boylston's time we find certain changes in the practice of our profession. The physician continued to be one of the leading spirits of the community. He was prominent politically, but he no longer played the dual role of medical adviser and minister to the soul. We find that medical thought was still dominated by the teachings in vogue in Great Britain, but we find each prominent physician teaching his apprentice or group of apprentices, and also find that many of these young men went to England to complete their education. A few went farther and studied on the Continent. They were independent in medical thought as they were in their politics. They delved into new things in medicine as they explored the terra incognita that lay beyond their settlements. They were still pioneers.

We read of those gallant gentlemen who gave of themselves that these United States should be forever free—names like Warren that have come down from father to son or nephew and still abide on the roster of the Massachusetts Medical Society. We read also of the Loyalists who devoted to King and mother country, followed the English troops—exiles for their political convictions. We may read between the lines and learn that the doctor of those early days was far more a leader in his community than we are—a man of broad education and interests, looked up to and admired for his good works and his leadership. There must have been much of

*The Annual Discourse delivered at the annual meeting of the Massachusetts Medical Society, Boston, May 22, 1940.

†Lecturer in Neurosurgery, Harvard Medical School; chief of neurosurgical service, Massachusetts General Hospital, Boston.

and much of bitterness in 1776, for we read that some of the pupils of the beloved teacher, James Lloyd, sailed for Halifax to lead the lonely lives of exiles. Other pupils, the younger and more radical element, donned the blue and buff of the colonial forces. The doctor's life was a hard one. He stood on his own feet, foursquare to the world, and worked out his problems for himself. He had no assistance from laboratory and roentgen ray and all those things that make diagnosis easier for us.

About the turn of the century, while the states were settling down trying to find out what they had won besides independence, the character of medical education changed. Schools were established and the apprentice system was abolished except for postgraduate education. We looked to England for much of our medical lore, but we as a pioneer community developed our own trends in medicine. That word "pioneer" means much in American life. We can be proud that the members of our profession lived up to their traditions and to the trend of their own times. Untrammelled by the taboos of European medicine, they developed along their own lines.

Many tall tales have come down to us of these old days before 1846, when Morton soaked a sponge with ether that the grand old man of the Massachusetts General Hospital, John Collins Warren, might demonstrate that painless surgery had arrived.

Even the small-town doctor did his investigating, and under difficulties that would make us cringe. There are two treasured legends in my own family, one concerning my great-great-grandfather, Ingalls Kittredge. He practiced in Beverly, and it is said he brushed up his anatomy as occasion offered. One rainy night he crossed the bridge which then, as now, connected Beverly and Salem and drove his shay by devious ways to Peabody, where he met certain grave robbers who delivered to him the body of a recently deceased and, we hope, respected citizen of that rather lonely hamlet. On his way home after midnight with the subject seated beside him, he reached the bridge. The toll gate was open and all was dark. A cut with his whip and the horse galloped out on the bridge. Just before he reached the gate the keeper rushed out and slammed it shut. The sudden stop unseated the doctor's gloomy companion, who pitched forward and nearly went out over the wheel.

Old Ingalls Kittredge must have had a strong and dexterous hand as well as an agile brain. He grasped him by the nape of the neck and pulled him back. "Sit down, ye drunken fool!" was his comment. He paid his toll and drove home.

Can we not take this legend to heart? Even if the night is dark and stormy and the way to our goal long, can we not forge ahead to the increase of our own knowledge and the betterment of our service to our fellow men?

Ingalls Kittredge, his son, also was of an investigative turn of mind. One day he had as a patient a man dying with fever. There was a mass in the right side of the abdomen. He decided there was pus present, and to the horror of his associates he cut into the abscess, washed it with clean water from the spring and drained it with clean tow from the center of the bundle. The man lived, else I might not be here, for the good townspeople of Beverly beset his house at the corner of Essex and Federal Streets with a hangman's rope at hand until it was known the patient was out of danger.

So much for the past. We can see a change—a tendency toward specialization if you will—even from the earliest days of the Massachusetts Bay Colony. At first our predecessors combined medicine with political and religious leadership. By the time of the Revolution they had given up their pastoral activities, then other intellectuals gradually assumed political leadership—medicine is a jealous mistress and will not permit a divided allegiance.

Our heritage, together with that of our predecessors in the last hundred years, is a grand one: self-confidence, leadership, the spirit of the pioneer, coupled with the desire to investigate and the will to achieve. They carried it with them in the migration to the West in the eighteen-forties and fifties, those hardy men of New England. From one of them, an obscure army surgeon at Mackinaw, came the brilliant investigation of gastric secretion that made the name of Beaumont famous. It was not only the adventurers who made the trek across the mountains to the plains. Whole families went, and to one of these pioneer groups that settled on the southern shore of Lake Erie we shall turn later for the greatest of the pioneers in neurosurgery—Harvey Cushing.

Neurosurgery has its beginnings in the cloudy past, before the days of history. This is attested by a collection of Peruvian skulls—one of the treasures of the Warren Museum at the Harvard Medical School. It is interesting to learn that then as now the man with the investigative mind might find that someone else had the same thought. In the museum at Copenhagen last summer I saw skulls from the Scandinavian countries with the same four saw cuts, the same holes, made to let out the evil spirit, and in some of them, as in the Peruvian skulls, the patient had survived the ordeal, for new bone had formed around the edge

of the opening. It is interesting to realize that in all ages and among all people the brain has been known as the seat of consciousness. I suppose that Cain learned this scientific truth when he struck Abel, that is, if he hit him on the head. It is even more interesting to realize the depths of our own ignorance of consciousness, the cause of sleep and so forth. We still have many things to learn. However, that is not the point at the moment. The point is that the priest, the surgeon or someone has been opening the skull since before the dawn of history, probably with the idea of curing some mental ill.

Neurosurgery in America can be said to be the offspring, born in lawful wedlock, of neurology and general surgery, with physiology as godfather. It is difficult to state exactly when and where this interesting event took place.

It seems to me that the organization in Philadelphia during the Civil War of an army hospital devoted to the treatment of nervous diseases both medical and surgical, marks the beginning of the special handling of neurosurgical cases. The men in charge of this project were well suited to carry out the new venture. S. Weir Mitchell was a neurologist and a physiologist, W. W. Keen an enthusiastic and daring surgeon, while George Moorehouse was an able medical man and administrator. The surgical cases treated were almost entirely due to injuries of peripheral nerves. Today neurosurgery is far more engaged with the central nervous system than with somatic nerve fibers outside the cerebrospinal axis.

By 1888 cranial localization and the surgery of tumors had become an important subject for consideration. Reading the transactions of the first meeting of the Congress of Physicians and Surgeons held at Washington in September of that year, we find the record of a symposium devoted to these subjects. Keen and Roswell Park, who were surgeons, took part, as did Charles K. Mills, M. Allen Starr and others, who were neurologists. David Ferrier and Sir Victor Horsley, leaders in physiology and brain surgery, came from England to attend this meeting and here we see again the close association of American and British medicine. We find also in these transactions the mention of a case of brain damage caused by birth injury reported by William N. Bullard in the February 16, 1888, issue of the *Boston Medical and Surgical Journal*; the operation was performed by Edward H. Bradford.

Let us think a moment of how neurosurgery was handled in Boston at that time and for the next twenty-five years. James Jackson Putnam had been appointed "electrician to the Massachusetts General Hospital in 1872 and neurologist in

1873. Since that time neurology had progressed but we find mention of barely a dozen cases of brain tumor in the programs of the Boston Society of Psychiatry and Neurology before 1905. Neurosurgical operations were few and far between, and were performed by the general surgeons at the instigation of and under the direction of the neurologists. However, even then certain surgeons were picked out, or perhaps picked on, by the neurologists to be the operators. As we have seen in the earlier reports, Bradford was one. My father was another. His was an investigative spirit and he delighted in exploring new fields. He obtained from Stone and Webster, then a young electrical engineering concern, a small electric motor, and devised a guarded circular saw with flexible cable which he used to open the skull. I keep the motor and saw as a memento of those early days. We must remember that all surgeons of that day here and abroad had ingrained in them by their predecessors the lesson that one of the prime requisites of surgery was speed. My father had it. Horsley had it. Maurice Richardson had it. With it they combined great deftness and precision. Speed is of great value today, but not so valuable as it was then, for now we have all the modern devices to combat shock and hemorrhage, and anesthesia has become a high art.

I can remember many of those early cranial operations during my work as house officer at the Massachusetts General Hospital, which began in 1906. The commonest was the operation for trigeminal neuralgia—usually the Abbe type, with intracranial section of the second and third divisions of the fifth cranial nerve. My father modified this operation by plugging the foramina with silver amalgam and later with bone wax. I can remember operations for tumor—one in particular on a patient of Dr. Putnam's, about 1908. We operated in a private hospital on Commonwealth Avenue, and Dr. Putnam's office nurse had never seen a brain operation. She stood between the windows of the room, and as the first incision in the scalp was made and the old T-shaped hemostats were applied, she collapsed on the floor with her head in the basin in which the bloody sponges were dropping. Someone dragged her out and that was that.

I also remember etherizing while Maurice Richardson operated for cerebellar tumor—big, red faced with a rolling gait accentuated by an old Potts fracture, he was a splendid general surgeon. There was no head rest. The anesthetist held the patient's head with one hand and the cone with the other, and the orderly or someone else poured on ether when the cone was held out under the edge of the sheet. I nearly drowned and nearly

etherized myself, and had to have a shampoo afterward. My own first attempts at brain surgery were of the same sort. I followed my masters. Their work was good as measured by the surgery of that day. I assisted Horsley in London for three months. Speed was his fetish. A sweeping scalp incision, four saw cuts with a hand saw, three or four taps of mallet on chisel, and a square of bone leaped out. Then came a rapid enucleation and even more rapid closure, all under a stream of weak bichloride solution. A physiologist, a neurologist, a surgeon, all in one, but trained in the old school of surgery.

What of neurosurgery in Massachusetts beyond the few men I have mentioned? Edward H. Nichols and Frederick C. Lund at the Boston City Hospital and others were doing neurosurgery as it came along. At the Massachusetts General Hospital, Charles A. Porter was working with Walter E. Paul, the neurologist, on peripheral nerve injuries and getting quite a series of cases. Not one of these men considered neurosurgery even as his major interest. The neurologists were doing more than the surgeons, for they were truly specializing in their chosen field and pioneering in the diagnosis of neurosurgical conditions and in some instances in treatment. Others besides Putnam were at work. I learned to know and respect Philip C. Knapp and E. Wyllys Taylor for their studies on the brain. Paul, as stated above, was working on the peripheral nerves, and George L. Walton had already published his important paper on cervical dislocations. I have one of the reprints which the latter gave to my father. Were any one of us to write that paper today there is little that we could add to it except some roentgen-ray pictures.

But at this time Harvey Cushing in Baltimore, Charles L. Frazier in Philadelphia and Ernest Sachs in St. Louis were beginning to develop real neurosurgical clinics. Cushing in particular was limiting his work to neurosurgery and modifying the meticulous, painstaking surgical technic originated by Halsted. Brain surgery requires the utmost in gentle handling of tissues, exact hemostasis and the persistence and ability to carry on for hours if necessary. To achieve this end, one must have a surgical team that is near perfection and every aid in anesthesia, instruments and operating-room facilities that modern science can give. Cushing recognized this fact and also the importance of exact and painstaking localization, with the use of every aid to be obtained from neurology and physiology.

Harvey Cushing came to Boston to become Moseley Professor of Surgery at Harvard and to thrill the world with the till then undreamed pos-

sibilities of cranial surgery. To Cushing, Massachusetts owes its supremacy in neurosurgery for many years. To him came patients from all over the world, and the young men flocked to sit at his feet and learn of his art. For with him, neurosurgery became an art. Surgeon, neurologist, pathologist and physiologist, he combined them all. Let us honor with the highest praise this illustrious figure in our profession who so recently has gone from us.

Let us examine the changes in neurosurgery that the seventy-five years from that first war hospital in Philadelphia to the present time have brought.

The pioneers have led us on from small beginnings to great achievements. Peripheral nerve surgery has become standardized. The surgery of brain tumor is on a firm foundation, and the spinal cord, the pituitary gland, even the ventricles of the brain, are open to inspection and treatment if need be.

What has Massachusetts added to the score since Harvey Cushing gave impetus to neurosurgery in this community?

A neurosurgical service is now an important part of many of our large hospitals. Donald Munro, the son of a gifted surgeon, John C. Munro, has taught us much about skull fracture, and also to seek out and find that elusive and treacherous aftermath of head injury, the subdural hematoma. Gilbert Horrax is following Cushing's lead in the surgery of brain tumor. Tracy J. Putnam left Boston last fall to become the head of the Neurological Institute in New York City. There he is carrying on the brilliant research work that he began in Boston. At New Haven, William German and John Fulton are carrying on the Cushing tradition of investigation and brilliant technical achievement. They received their training here in Massachusetts and as New Englanders we can claim them as our own. At the Massachusetts General Hospital we are busy with our problems in relation to the central nervous system. From a few scattered beds neurology and neurosurgery have grown to the status of independent services with a permanent visiting staff and a group of residents. From less than fifty operative procedures a year we have grown to more than that number a month. In the surgery of the sympathetic nervous system James C. White and Reginald H. Smithwick are exploring untrodden pathways.

The specialist does not spring full panoplied: Pallas Athena did from the head of Zeus. He is a long apprenticeship, not to one teacher: in colonial days, but nonetheless an apprenticeship. He must sweat his way through college and medical school with the others who, like himself, b

lieve that the healing art is the ultimate in service to humanity. Then comes his hospital service, his work in allied branches of medicine and finally his residency in his chosen field. Five full years and perhaps more. Then comes the plunge and he is out on his own.

Cushing's clinic at the Peter Bent Brigham Hospital was the first in New England to educate neurosurgeons, and they are following in his footsteps all over the world. Now there are other groups carrying out the same plan. We find these young men in medical schools in large centers and also in the small cities. Some of them have had hard work to get started, owing to professional jealousy and the desire of some of our profession to do everything in surgery whether they do it well or ill. More have been welcomed as helpers in the field and through their efforts the standards of practice in their communities are being elevated. I look forward to the day when the whole of this country will be covered by men trained in this branch of surgery as it is by the exponents of the other specialties.

Prophecy is dangerous and the prophet is often discredited, but I believe that we can see a bit ahead. The malignant gliomas will defeat us. It is for some new pioneer to lead us out of that hornet's nest. The sympathetic nervous system has yielded many triumphs since Royle's ill-starred attempts to modify spasticity brought it to our attention. Fulton at the Peter Bent Brigham Hospital studied one of these early cases and was quick to see the possibilities of its effect on the vascular system. Smithwick and White have added to our knowledge, and I believe there are great possibilities ahead, including control of pain, the amelioration of hypertension and so forth.

The possibility of the surgical treatment of certain forms of insanity is more than a rainbow. Destructive surgery, it is true, but nevertheless it may be the dawn of a new era in the treatment of this tremendous group of sufferers.

Neurosurgery is ever changing. As it goes forward to these new things, it is setting aside and giving to the profession at large certain things that it called its own not so many years ago. Who does the nerve sutures in our great hospitals today? Not the neurosurgeons; no, indeed. The house officer dealing with severed tendons in the wrist picks up and sutures the median or ulnar nerve as a matter of course. The surgeon caring for a fracture of the humerus cares for the musculospiral nerve, and in the war hospitals of Europe the operating surgeons in the mobile units are repairing bullet wounds of nerves and of the central nervous system.

What lesson may we learn from these facts

which I have brought so sketchily to your attention? Neurosurgery has been and is undergoing a period of growth and expansion, partly on account of research and advance by neurosurgeons in their own field, and partly because of the application in neurosurgery of advances in general surgery, in neurology and in physiology. It is by reason of this continuing advance that neurosurgery is accepted as a specialty in medicine. It is not a narrow, hidebound specialty but a broad specialty equipped and able to invade that all important cavity containing the central nervous system and to follow through the body wherever nerve cells send their tendrils. But that is not all. Today the neurosurgeon is going forward as a pioneer, following the precept of all pioneers and blazing out new trails for others to follow. So it is with all specialization in medicine. Specialties will hold unto themselves certain procedures which because of their inherent difficulties or because of the complicated equipment necessary to carry them out, are not suitable for general use. It would be folly for one not especially trained to attempt the surgery of brain tumor, nor could one of us neurosurgeons in his own office perform the miracles of diagnosis carried out daily by the radiologist. As soon as a procedure becomes standardized and can be applied by the profession at large, it should cease to be held and guarded as a potboiler by the specialist. If he waits beside the trail, nursing his little potboiling fire, he will fall behind his brother pioneers and the profession may lack something which they could use for the betterment of humanity.

These are the thoughts that I would leave with you in these closing hours of the 1940 meeting of the Massachusetts Medical Society. All of us are seekers after truth, and especially for that truth which will benefit the health of our fellow men. Ours is a science, an art and not a business. To apply business methods to medicine either by our own volition or by legislation will impede its advance. By giving of ourselves without stint we shall obviate the necessity of such regulation. Surgery is like a great river ever flowing onward. This river is made up of the waters of many streams, and of these neurosurgery is one. Each stream contributes something to the whole and to the smooth course of the river's progress. Any one of us, in practice, in the laboratory, in a specialty or in any of the many branches of medical science, may come upon some hidden spring to add to its volume. Let us, as members of the Massachusetts Medical Society, seek out these hidden springs and share them with the brethren of our profession, to the end that suffering and sickness be lessened in the world.

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MINOR CAUSALGIA A HYPERESTHETIC NEUROVASCULAR SYNDROME*

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THERE is a very peculiar circulatory disease or symptom-complex which affects the extremities and which is marked especially by exaggerated sensitiveness of the skin. This hyperesthesia is such that any touch excites a sort of pain which the patient very much dreads. There often is but need not be spontaneous pain. Nevertheless it is so difficult to carry on everyday affairs without some contact of the part that in many a case the patient is made uncontrollably nervous, depressed and apprehensive. There are serious cases and mild ones, and it is the serious ones which have made the mild ones understandable.

Many years ago, S. Weir Mitchell¹ described the bad sort as causalgia, that is, burning pain. Those of you to whom this term means anything at all will recall that the word referred to a state of glossy redness of a hand or foot, atrophied soft parts, tapered digits, and nails much curved transversely. The burning pain, always present, was comparatively bearable until a touch or even a sound, a draft or a jar caused an agonizing increase. The patients, who were always wounded soldiers, soon became invalids, carrying about a bottle of water and a sponge with which they kept the limb moist at all times.

Mitchell's cases all resulted from wounds received in the Civil War and very little attention was paid to his descriptions until the War of 1914-18 produced a new and abundant crop. As a rule, a large nerve had been injured, very often some part of the brachial plexus, though if one nerve alone were involved, it was usually the sciatic or median. However, as experiences multiplied, it seemed that actually no nerve need be wounded. An artery might be damaged, and as the early symptoms were studied, the cyanosis, the sweating, the paroxysmal nature of the pain, all gave the impression of a sympathetic disorder. At least they did so to René Leriche,^{2, 3} the champion of the sympathetic system as a participator in pain of all sorts. Leriche suggested that arterial wounds were really at the bottom of causalgia and pointed out that the median and sciatic nerves, and of course the brachial plexus, whose injured nervous tissue had seemed at first the

basis of the lesion, have an abundant arterial supply.

It is now well known that arteries are well furnished with sensory filaments, and it has been established (Moore⁴) that these filaments travel into the spinal cord with the posterior, or sensory, roots. How such fibers make reflex arcs with outgoing vasomotor nerves, the classical sympathetic system is, for the moment, unimportant. There probably are reflexes traveling by way of the spinal cord and there may even be local reflexes through plexuses upon the walls of the larger vessels. In any case, signs of sympathetic irritation, that is, sweating and peripheral vascular spasm, can be brought on by central going impulses originating in and about the walls of the arteries and, for that matter, the veins. This is not the place to discuss the problem of why some of these reflex sympathetic disorders are painful and others not, why some leave the skin hot and others cold, why some are attended by edema and others by bone atrophy, why some appear to represent, in addition to everything else, paralysis of great mixed nerves. All are dysfunctions, into which the sympathetic system, primarily a vasomotor mechanism, enters in a very mysterious manner. How, for instance, is it related to pain? Clinical and physiological observations must in time give answer. At least it is fortunate that the causalgia-like states can be relieved, or at least improved, by a procaine block of the sympathetic supply to the limb in question, and that the relief lasts for at least the duration of the block. A clear case of pain and hypersensitiveness due to pure arterial irritation is the following.

A middle-aged man had suffered an arterial embolism. The embolus had become fixed in the left radial artery, which felt like a pencil, and could be followed without pulsation into the anatomical snuffbox. The hand was cool, a little pale, cyanotic and agonizingly sensitive to the touch. Two of the fingers, held partly flexed, were especially blue, cold and so very tender that the man guarded them at all times and refused to allow them to be straightened. When the plugged radial artery was resected under procaine, a sudden and dramatic change occurred. The hand not only felt comfortable to the patient but could now be freely handled. The color of the fingers at once improved.

Thus, fingers which were tributary to no outgoing nerves which could possibly have been influenced by the arterial resection were relieved of a painful vasospasm by the interruption of impulses travel-

*The Presidential Address delivered at the annual meeting of the New England Surgical Society, Salem, Massachusetts, September 29, 1939.

ing centrally along an artery. The accompanying anatomical diagram (Fig 1) explains this contention.

One more bit of explanation. If a blood vessel is bruised or shocked by a bullet without suffering an actual wound, it goes into a state of spasm and

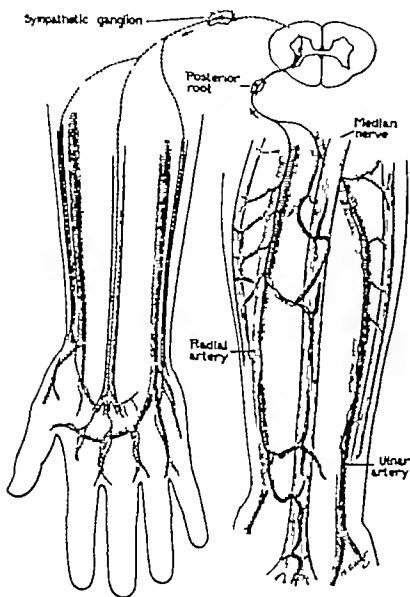


FIGURE 1 A Diagram Representing a Possible Course of the Reflex Impulses Responsible for Causalgia Traumatic Edema Reflex Dystrophy and So Forth

In the limb on the right the size of the median nerve and of the radial and ulnar arteries is exaggerated. The sensory (?) nerves of the arteries are shown in solid black lines and the relation of these nerves to the small arteries of the median nerve can be seen (no attempt is made to show the arterial supply with its attendant nerves for the radial and ulnar nerves)

The nerves pass centrally along the arteries enter the spinal cord in the posterior roots connecting with outgoing sympathetic fibers. The supposed course of the reflex is indicated by arrows.

The sympathetic fibers are distributed via the great mixed nerves to the periphery supplying the vessels of the hand in definite anatomical fields identical with the sensory distribution.

the tissues peripheral to the point of contact become pale, cyanotic and numb, perhaps absolutely insensitive. This is an acute direct and probably local arterial spasm. Moreover it is often temporary. But if a blood vessel is irritated by pressure, or by minor infection, if the tiny nerves

about a good sized artery are teased, or if this teasing is extended to a multitude of small vessels in a limb, there may arise one of these strange, hyperesthetic, atrophic, sometimes edematous states which I am to describe to you. I will quote you one more case to illustrate the effect of a lesion affecting apparently the smaller blood vessels. This is taken from a publication of Lehman.⁴

D. E. D. a schoolgirl of 18 had suffered, 4 months before coming under observation, a punctured wound by a crabapple thorn upon the ulnar border of the right forearm. This had become infected and had been subjected to exploration and drainage. A sinus had been left surrounded by induration heat and redness which extended halfway to both wrist and elbow. The patient feared to have the forearm touched and could barely move the wrist and fingers. During the following 7 months, four operations for drainage were performed. Almost a year after the original injury the forearm and upper arm were swollen and doughy up to the axilla. Pain was increasing. The fingers were cool. The right radial and brachial arteries pulsated (to the touch) less strongly than those of the left hand. Though one of the old incisions was unhealed, the temperature and leukocyte count were normal. Amputation had been suggested.

On the ground that the condition resembled the "trophic edema" of some war wounds, and because tissue removed at the last operation had shown a perivascular inflammation a periarterial sympathectomy was performed upon the right brachial artery. Two days after the operation the fingers were a little less stiff and tenderness of the forearm had diminished. Six weeks later motion at the elbow was free and that of the fingers was continuing to improve. Swelling had disappeared and the skin had become warm and dry. The wound had healed. In 6 months, except for some weakness the extremity was normal. The disease had been cured by interrupting what seem to be ingoing arterial nerves.

That there is something basically at fault about the nervous systems of certain of the individuals affected, is probable. Some are insurance problems. Others have grudges against the world, or are perhaps stupid or even criminal. It is easy enough to find fault with anyone who suffers from a disorder which seems to have no reasonable origin. For all of the ailments which touch off the causalgia like reflex are commonplace and ordinarily are recovered from in a commonplace way. The reason that the strange states they occasion are not more often recognized is because of our extraordinary, indeed, infernal obstinacy in trying to fit things into categories. We think and teach that we can catalogue every diseased state we see. If we cannot catalogue it, we say it is not a diseased state at all. I suppose that in my everyday clinical experience, I am unable to explain at least thirty per cent of the patients' complaints. In this thirty per cent are included states which others doubtless understand and which would be clear to me if someone would lead me by the nose. I judge that to this "thirty per cent"

of many of you are included the reflex sympathetic disorders which are the subject of these remarks

In recounting underlying causes I could begin with fractures, or thrombophlebitis or minor burns, but actually I will begin with a dog-bite

M F D, a single woman of 37, was bitten on the back of the right hand by a dog. A local cellulitis



FIGURE 2 M F D An Instance of Mild Causalgia Following a Dog Bite

Notice the smoothness of the skin of the right hand as compared with that of the left, especially the lack of transverse wrinkles over the interphalangeal joints. This photograph was taken five months after the bite was received

rapidly developed. She entered the hospital 24 hours later. Her axillary lymph nodes were enlarged and her fingers stiff. She left the hospital in 3 days and soon seemed to have fully recovered, but 4 months later she returned. A few days earlier, the back of the right hand and thenar space had swollen. The fingers were a little bluish. They were held straight, the thumb adducted as in a median paralysis, the typical causalgia position. There was a brownish discoloration about the wound, which discharged a little serum. The x-ray showed some decalcifications of the bones and narrowing of the joint spaces. There was an intense hyperesthesia of both hand, fingers and forearm, yet light touch was poorly felt in the area of excessive sensitiveness to scratching or gentle pinprick. The patient was treated by hot soaks, the hand and forearm kept in a sling.

Two months later, that is, 5 months after the original injury, the patient was still unable, because of hyperesthesia, to use her hand. Actually, she was considerably

improved. There was a little brownish discoloration about the bites. The skin of the hand and fingers was smooth, as is shown in the photograph (Fig 2). It was a little warmer to the touch than the other hand. At this time, a sympathetic block of the stellate ganglion completely removed, for the moment, all the sensitiveness to touch, pinching and pinprick. A rise of temperature to over 90°F showed that a full sympathetic paralysis had been secured. The hand felt dry and hot. From this time on, improvement was steady and in a week or two the woman was at work again.

Here, then, is a mild causalgia, due to a (streptococcal?) infection following a dog-bite, and showing the typical smooth, hypersensitive skin, partial muscular paralysis and bone atrophy. There is a tendency to spontaneous recovery which the sympathetic block seems to have hastened.

The next is a case of a very different sort. At first sight, it seems hardly possible that it is related to the type of causalgia first illustrated.

J D T, a man of 30 years of age, about 2 years before was said to have strained his back lifting and was then discovered to have an inguinal hernia, which was believed to have been caused by the strain. Actually, his discomforts were probably due to a fractured lumbar transverse process which was only discovered later. However, an operation for hernia was performed and was followed by a right-sided femoriliac thrombophlebitis. The thrombophlebitis left behind a leg which gave him an extraordinary amount of trouble. The lower part was slightly swollen and cyanotic, but the chief complaint was of hyperesthesia and pain. He not only suffered spontaneous cramps in the early morning but from a heavy numb feeling on walking. The purple color underwent a disagreeable red reaction on exposure to the sun. Subjectively, the foot felt cold.

Examination showed a diminished arterial oscillation in the right calf, equal posterior tibial arteries and a diminished right dorsalis pedis pulsation. Brisk walking brought on the numbness and increased the coldness of the right leg. The hyperesthesia was especially bad on squeezing the calf, as with a blood pressure cuff. It included his whole leg, extending up to the right flank and back, the region of his fractured transverse process. It even spilled over into the left side of the back. The patient was unhappy, apprehensive and demoralized.

A right lumbar sympathetic block gave a typical rise of surface temperature for the right foot and relieved most of the hypersensitiveness. For perhaps 48 hours, the cramps and hyperesthesia disappeared, but at the end of this time both troubles recurred.

In this case, it is clear that the irritating lesion is perivascular, that is, about the great vessels in the region of the groin and pelvis, the scene of the thrombophlebitis. Leriche would advise, I think, separating the artery and vein (dividing the vein?) and a lumbar sympathectomy, and doubtless a very considerable procedure may be necessary to interrupt the vicious impulses. I have seen a somewhat similar result follow an axillary thrombosis.

In the two following cases, the causalgia is supposedly due to nerve injury. The first is of median

origin, the second is presumably due to division of the small sensory nerves upon the two sides of the outer phalanx of the thumb.

E. A. D., a married woman of 50 or so had long haunted the outpatient department complaining chiefly of arthritis. Recently she had suffered a Colles's fracture of the left radius with marked posterior displacement. Reduction secured fair position and the hand was immobilized in acute flexion. Whether it was the initial injury or the flexed position which brought on the subsequent difficulties is not clear supposedly the acute flexion, especially since it has been shown that in this position the median nerve is apt to be compressed between the hard edge of the transverse carpal ligament and the lower edge of the radius. However that may be, the fingers rapidly swelled, pain was severe and the palmar aspect of the wrist became blistered. A neutral position was at once adopted but at the end of 6 weeks little motion had returned to the fingers and wrist. The hand was painful and edematous. Hyperesthesia of the hand and wrist was extraordinarily severe. The forefinger could not even be touched.

A procaine block of the sympathetic supply to the arm completely relieved all pain and sensitiveness, restoring much freedom of motion. The relief was, of course, only temporary, but from this time on the patient began to improve. She has since had her ups and downs, but all that is left is a somewhat numb prickly feeling in the tip of the forefinger and thumb. That is to say the causalgia is gone. The aftermath of a partial median nerve paralysis remains.

The last case to be quoted is that of C. O., a married woman, 30 years of age, who had been operated upon 4 months earlier for a felon of the right thumb. A "fish-mouth" incision had been made and had healed promptly but increasing pain and tenderness, confined to the terminal phalanx, had then set in so that even the lightest touch had become agonizing. The patient was unwilling to move the thumb and guarded it at all times.

An upper thoracic sympathetic block brought about a characteristic rise of temperature, that is, complete paralysis of all sympathetic impulses, and during the sympathetic paralysis, hyperaesthesia was dramatically relieved. The outer phalanx of the thumb could be handled and moved freely but it was noted that between the incision and the nail at the tip of the thumb the skin was unpleasantly numb, as in the case of a skin field imperfectly supplied with sensation. During the day of injection the hyperaesthesia gradually returned.

It was held that a periarterial sympathectomy performed upon the radial artery at the wrist, by interrupting incoming impulses traversing the vessel would probably be curative. Accordingly the veins associated with the radial artery the loose tissues about the artery and the adventitia itself were removed for a distance of perhaps 5 cm. The result was as striking as was that of the sympathetic block. All hyperaesthesia disappeared leaving behind the unpleasantly numb area under the edge of the nail. Six weeks later the comfort persisted though the patient still spared the thumb. The relief should be permanent.

You will appreciate, I am sure, how hard it is to see just what goes wrong in such cases, and you will feel this all the more when I tell you that other, somewhat similar results have followed a slight burn of the arm in an epileptic girl an

operation for Dupuytren's contracture of the hand, a cat-bite, the falling of an arm over the edge of the operating table or bed and the dropping of a block of wood upon the instep. Obviously, the sign which is most definitely common to all these cases is the hyperaesthesia. That this is related to a sympathetic dysfunction is suggested by the remarkable effect of a sympathetic block upon the limb involved. However this merely supports Lenche's contention that the sympathetic is concerned in some way with all pain. It does not tell how an infected dog-bite of the back of the hand causes the reflex irritation. It is perhaps safest to believe, for the moment, that perivascular sensitive fibers, whether lying upon a large vessel or surrounding many tiny arteries, whether in the soft parts or in the midst of a great nerve, are able to excite a prolonged, vicious, reflex, sympathetic disorder. The path of this reflex is not evident, but since it can usually perhaps always, be broken by blocking or dividing the sympathetic ganglionic chain, it may well pass into and out of the spinal cord. It can also be interrupted as has been told above, along the course of the principal artery of the limb—the radial or the brachial, for instance, in the case of a causalgia originating in the hand. It is not easy to reconcile this reflex mechanism, which seems to use a sympathetic pathway, with Sir Thomas Lewis's recent observations upon pain and sensitiveness of the parts about an injury. As a result of experiments upon human beings, he finds that pain, tenderness and the vascular flare are related to hitherto unrecognized "nocifensor" nerves, that is, nerves having a function different from the sensory fibers of the skin. He believes that the stimulation of injury excites these widely arborizing neurons, through axon reflexes, to activate in some way the sensory nerves, lowering their threshold to pain. At the same time the nocifensor reaction calls forth a vascular dilatation. Yet its neurons are not a part of the sympathetic system and act in its absence, having their cell bodies in the sensory, posterior-root ganglia. Lewis finds further that these same nocifensor fibers can be irritated to action by injury to a large nerve trunk, so that they may well be responsible for causalgia and causalgia like states. Certainly the mechanism he describes is admirably adapted to setting up and maintaining this peculiar symptom-complex. Unfortunately it still leaves much to the imagination, ignoring the obvious relief offered by sympathetic block whether temporary or permanent. Doubtless, many more painstaking anatomicophysiological researches must still be undertaken.

Whatever their origin, the minor causalgias

which I have described are a cause of much misery. Recently, Livingston⁷ has very fully discussed them. He is particularly interested in discovering the spot from which the reflex seems to have arisen, the point of injury. Indeed, his paper is entitled "Post-Traumatic Pain Syndromes" and he has demonstrated that the injection of procaine into the "trigger point," repeatedly if necessary, may be curative. My own tendency has been to attempt interruption of the reflex arc, at any available point, by procaine block or surgical excision. You will notice, however, that most cases do not come to surgery. The disorder is often functional, not at first, perhaps, but later. It is overlain by hysterical symptoms. It is subject to the "compensation neurosis" so familiar to the insurance companies and their physicians. If you think that for such reasons this is a dangerous field for all who are not thoroughly familiar with it, at least you will agree that it is a fascinating field, and you will realize that the cure of

patients suffering from a causalgia-like state is likely to earn their whole-hearted gratitude. The painstaking study of common ailments is just as full of rewards as it ever was, and the causalgias are rather common in medical and surgical practice today. They certainly fall among the thirty per cent of cases as to which most of us are blind or ignorant. I suggest that you keep them in mind.

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EXTREME LEUKOCYTOSIS AND ACUTE HEMOLYTIC ANEMIA ASSOCIATED WITH THE ADMINISTRATION OF SULFANILAMIDE*

Report of a Case

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IN VIEW of the seriousness of the acute hemolytic anemias that occasionally follow the administration of sulfanilamide, the following case seems worthy of record.

CASE REPORT

C. C., a 34-year-old Negro porter, was admitted to the Parkland Hospital on July 29, 1939, complaining of a swelling in the perineum and marked weakness. Several weeks previously, he had developed a urethral discharge, followed by difficulty in urinating. An abscess had appeared in the perineum, which was incised and drained by his local physician 5 weeks before entry. He was given a few "white tablets" at this time, of an indeterminate nature, with no noteworthy effect. Four days before entry, in the Outpatient Department, the perineal abscess had been reopened and the patient started on sulfanilamide. At home, he gradually became weaker and stuporous, and was admitted to the hospital. At the time of the first blood examination he had taken eighty-four 5 grain tablets of sulfanilamide, making a total of 420 gr over a period of 5 days. He had had gonorrhea 14 and 11 years previously, cured by local treatment. Fourteen years before entry he had had a chancre, and had taken antisyphilitic treatment for a year at that time.

The temperature was 101.6°F, the pulse 120 and the respirations 22. The patient was well developed, lethargic and obviously acutely ill. The mucous membranes were extremely pale. The tongue was coated and pale. The lungs were normal. The heart rate was rapid, with a loud systolic murmur at the apex. The blood pressure was 116/52. Examination of the abdomen showed a fluctuant, tender, reddened, subcutaneous mass in the suprapubic region pointing in the midline 5 cm. above the symphysis. The skin of the penis was undermined by a dissecting abscess. The entire perineum was tense and bulging, with several sinuses draining foul, purulent material. The scrotum was markedly edematous. Rectal examination was essentially normal. There was no lymphadenopathy.

Examination of the blood revealed the following: Red blood cells 1,240,000, hemoglobin 21 per cent (Sahli), white blood cells 140,000, of which 36 per cent were segmented polymorphonuclears, 13 per cent juvenile neutrophils, 18 per cent band forms, 22 per cent lymphocytes, 2 per cent monocytes, 6 per cent myelocytes and 3 per cent myeloblasts. The smear showed achromia, poikilocytosis and polychromatophilia. An average of 5 normoblasts was seen in counting 100 leukocytes. Urinalysis showed a cloudy, amber specimen with a specific gravity of 1.011, a ++ albumin test and no sugar. The sediment contained 18 to 20 leukocytes per high power field, a moderate number of erythrocytes and a few granular casts. The urinary findings were considered due to the local infection. Kline, Kahn and Wassermann reactions were positive. Subsequent laboratory data are shown in Table 1. The

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elevated blood-nitrogen level was interpreted as being caused by the urinary tract obstruction.

Diagnoses of periurethral abscess, with extension, and acute hemolytic anemia associated with the administration of sulfanilamide were made. The high leukocyte count could not be explained but the possibility of a leukemia as a cause of the whole picture was entertained. In any

in contradistinction to the granulocytopenia that is usually considered a hazard of sulfanilamide administration prompted us to analyze several cases of acute hemolytic anemia reported in detail in the literature.²⁻⁷

The acute anemia is usually ushered in early

TABLE 1 *Clinical Laboratory Findings*

| HOSPITAL DAY | HEMOGLOBIN (SABO) | RED-CELL COUNT | WHITE-CELL COUNT | BLOOD URIC ACID | BLOOD CALCIUM | ICTERIC INDEX | TRANSFUSED BLOOD | REMARKS |
|-----------------|----------------------|-------------------|---------------------|--------------------|------------------|------------------|---------------------|---|
| | % | $\times 10^6$ | $\times 10^6$ | mg % | mg % | | cc | |
| 1 | 21 | 1.24 | 140 | — | — | — | — | Myeloblasts and myelocytes in smear |
| 2 (operation) | — | — | 108 | — | — | — | 500 | Myeloblasts and myelocytes in smear |
| 3 | — | — | — | 93 | 2.3 | 16 | 500 | Myeloblasts and myelocytes in smear |
| 4 | — | 2.40 | 54 | — | — | — | 625 | Reticulocyte count 52 per cent; 11 normoblasts and 6 myeloblasts seen while counting 100 leukocytes |
| 5 | — | 2.70 | 19 | 4 | 1.5 | 10 | 600 | |
| 7 | 76 | 3.60 | 11 | — | — | — | 500 | |
| 10 | 80 | 3.80 | 10 | 36 | 1.7 | 6 | — | |
| 21 | — | 4.0 | 7 | — | — | — | — | |

event, surgical drainage of the septic areas and blood transfusions seemed indicated.

On the day after admission the patient was given a light nitrous oxide and oxygen anesthesia and rapid, wide incision and drainage of the perineal, scrotal and suprapubic lesions were carried out. An external urethrotomy was also done, through a structured membranous urethra. The patient was given 600 cc. of citrated blood and was returned to the ward in poor condition.

For 48 hours the patient appeared in critical condition. He was given frequent blood transfusions, intravenous glucose and constant inhalation of oxygen through the Boothby mask. On the 3rd postoperative day he showed definite improvement, and thereafter gradually recovered. The urethrotomy tube was removed at the end of a week and the wounds granulated in rapidly. Sounds were passed during the convalescence. The patient was discharged on the 24th hospital day. He has been seen in the Out patient Department, and continues in satisfactory condition.

The acute form of hemolytic anemia following sulfanilamide therapy is one of the most serious complications of this drug. It is to be distinguished from the comparatively slight, slowly developing drop in hemoglobin that commonly occurs when sulfanilamide administration is prolonged for ten days or more. Harvey and Janeway¹ first described the acute anemia associated with sulfanilamide, reporting 3 cases. Later, Wood discussed the condition and reported on 21 cases of acute anemia occurring in 522 patients treated with sulfanilamide, an incidence of 4 per cent. That this figure is probably considerably higher than the average is indicated by the comparatively few reports in the literature and by the fact that at Parkland Hospital, where over 2000 patients have received the drug under adequate precautions, no case of acute hemolytic anemia, other than the one here reported has been encountered.

The extremely high leukocyte count in our case

in the course of sulfanilamide therapy in a patient apparently responding satisfactorily to the medication. Nausea, dizziness, pallor, jaundice, malaise, weakness and fever are clinical manifestations while the erythrocyte count and hemoglobin content of the blood fall rapidly and sharply. The signs of anemia may come on from thirty six hours to seven days after beginning treatment, the average time of the maximum anemia being five days after onset of use of the drug. No case has developed after the first week of treatment. Cases have occurred in patients from ten months to sixty four years of age. The conditions for which the drug was given have been varied, and there is no relation between the occurrence of the anemia and the type of infecting organism.

The process seems unrelated to the dosage of sulfanilamide or to its concentration in the blood. In a twenty-six year-old woman, a severe anemia ensued thirty six hours after the administrations of only 100 gr. The highest blood concentration of sulfanilamide found by Wood in his anemia cases was 107 mg per 100 cc., whereas blood levels as high as 40 mg were observed in patients not developing anemia.

The pathogenesis of the disease is not well understood. That the anemia is due to a rapid peripheral hemolysis is shown by the sudden drop in the hemoglobin and red-cell count, the rise in the icteric index, the presence of excessive amounts of bile pigment in the urine and, occasionally, frank hemoglobinuria. There is no increase in the fragility of the erythrocytes. In the 2 fatal cases reported, necropsy has revealed erythropoietic hyperplasia in the bone marrow, which is the usual response to peripheral blood destruction, and there has been no sign of bone-marrow depression such

as occurs in the aplastic anemia following arsenic or benzol poisoning

Harvey and Janeway point out the similarity of this type of anemia to the hemolytic crises produced by phenylhydrazine, and suggest that susceptible individuals may produce a toxic product from the sulfanilamide having a phenylhydrazine-

TABLE 2 Comparative Blood Findings from the Literature *

| SOURCE | HEMOGLOBIN | RED-CELL COUNT | WHITE-CELL COUNT |
|---|-------------|----------------|------------------|
| | % | $\times 10^6$ | $\times 10^3$ |
| Harvey and Janeway ¹ | | | |
| Case 1 | 30 | 1.57 | 87 |
| Case 2 | 18 | 2.0 | 30 |
| Case 3 | 40 | 2.02 | 32 |
| Kohn ³ | 40 (6.0 gm) | 2.0 | 47 |
| Wood ⁴ | 22 (3.5 gm) | 1.13 | 26 |
| Koletsky ⁵ | 45 | 1.45 | 24 |
| Antopol, Applebaum and Goldman ⁶ | | | |
| Case 1 | 25 | 1.5 | 56 |
| Case 2 | 50 | 2.2 | 21 |
| Spence and Roberts | 21 | 1.24 | 140 |

*In 7 of the cases myeloblasts, myelocytes and nucleated red blood cells were noted

like action. Wood found that in 4 of 5 patients in whom the drug was repeated after the development of an acute hemolytic anemia during their first course, a recurrence took place. All the evidence would thus seem to warrant classifying this disorder as one of drug idiosyncrasy.

The leukemoid blood picture in our case seems an exaggeration of the moderate to marked leukocytosis in other reported cases (Table 2). We have no explanation of its mechanism beyond suggesting that it may have been simply a concomitant of the marked bone-marrow stimulation and hyperplasia. A leukemoid reaction with sulfapyridine has recently been described by Moody and Knouf.⁸ Some idea of the marrow activity is shown by the occurrence of 52 per cent reticulocytes on one occasion in our case.

The treatment of the acute anemia involves withdrawal of the drug, forcing of fluids and maximum transfusions of blood. The convalescence is strikingly rapid after the patient surmounts the hemolytic crisis. In one of the 2 reported deaths, no blood was available for transfusion, and in the other, the amount of blood given was apparently inadequate.

SUMMARY

The acute form of hemolytic anemia following sulfanilamide therapy is characterized by a rapid fall in the erythrocyte count and hemoglobin content of the blood during the first few days of sulfanilamide administration. The process is apparently a peripheral hemolysis due to an idiosyncrasy to the drug and is unrelated to the dosage, concentration of sulfanilamide in the blood or type of infection. The bone marrow shows evidence of hyperplasia.

An accompanying moderate to marked leukocytosis has been noted as a part of the syndrome, but has not been emphasized. The case reported illustrates the occurrence of a leukemoid blood picture and the marked height to which the leukocyte count may rise in this condition.

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REPORT ON MEDICAL PROGRESS

ENDOCRINES THE USE OF TESTOSTERONE*

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THE drug testosterone is worthy of lengthy discussion, for when its use is indicated it is powerful and of considerable value. Indeed in my experience this is one of the most potent drugs recently introduced to medicine. Because its effects are so definite and widespread its use should be regulated with careful judgment and understanding. Testosterone is a synthetic preparation apparently identical with the active hormone that has been isolated from the testes by Laqueur and his associates.¹ It is more potent than the androgen (male hormone), androsterone, which has been isolated from the urine. In preparing the drug it is now generally made as testosterone esters, and the propionate is now commonly employed, for it produces a more prolonged effect than does the simpler testosterone. These drugs must be injected parenterally though recently the use of an inunction has been introduced. Intramuscular doses are large and are commonly 10 to 25 mg. of the crystallized synthetic compound, injected as often as three times a week. While this is a large amount in endocrine therapy, it has at least a counterpart in the excretion rates. In normal individuals, both male and female, the ratio of urinary excretion of androgens to estrogens lies between 500:1 and 1000:1 in terms of weight so it is not surprising that similar ratio differences are found in the amounts necessary for therapeutic purposes.

It has long been well known that androgens are excreted in the urine of both males and females, and in fact in fairly high concentration. Recently, Nathanson, Towne and Aub have studied excretion in children and have found that even children of three years of age have a definite androgen excretion which gradually increases as puberty approaches. Boys, as well as men have a higher output than have females. However, there is no cyclic excretion of androgens as there is of estrogens, and therefore it is not necessary to do repeated observations in the study of the androgen excretion if this determination appears necessary before instituting therapy.

It must be remembered that though the effects of testosterone esters are apt to be striking, their

use is a pure substitution therapy just as is that of insulin. Testosterone does not stimulate the pituitary gland to greater activity in large doses, indeed, it appears to inhibit temporarily this important gland. The result is that testosterone does not stimulate the growth of the testes. It substitutes for the active secretion of that gland, and does this only so long as its injection is continued. McCullagh² has reported, and Nathanson's work³ confirms, that when testosterone is injected the androgens rise abruptly in the urine but return to their original level within forty-eight hours after the injection. But not all injected testosterone appears in the urine. What becomes of the remainder is not known. If a large dose of testosterone is given to individuals who are already excreting androgens after forty-eight hours the excretion level falls below the original level suggesting an inhibiting effect on the sex stimulating hormone of the pituitary gland.

When testosterone is injected into women the undesirable sequelae of hypertrichosis, enlargement of the clitoris and deepening of the voice may occur. The hypertrichosis may last for some months and has been said to remain even longer in old people. While these results have usually come only with the use of very large amounts of the drug, such changes have been observed with therapeutic doses. This possibility must be constantly borne in mind when the drug is employed in women. These undesirable effects of testosterone are described by Greenhill and Freed⁴ in 2 women who received 50 mg. every two or three days. They soon complained of increasing hair growth, and in one of them this was still present four months after the last injection. While this must be taken as a warning in regard to the use of testosterone, the amounts they received are probably larger than necessary for therapeutic effects.

Testosterone and its esters appear in my experience to be well tolerated, though their effects on the general feeling of patients may vary. Frequently patients respond with an increase of general vigor, though I have seen occasional responses of fatigue and lassitude. It is nearly impossible to dissociate these reactions from purely psychological responses to injections, but objective

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evidences of the action of testosterone are obvious in many clinical conditions. The literature on this subject is rapidly enlarging, and though the following report is not based on a complete bibliography, it covers most of the important recent articles on the subject.

The Council on Pharmacy and Chemistry⁶ of the American Medical Association recently issued a most interesting and instructive report on the present status of testosterone, and decided not to include these preparations in its book *New and Non-Official Remedies* until the preparations had been properly evaluated by ample clinical experience. This decision was arrived at because of the varied claims made for the new drugs. It is obvious that a compound such as this needs careful evaluation before it can be recommended, and much exploratory work needs to be done before its applications in medicine will be well understood.

USE FOR HYPOGONADISM IN MALES

The best treatment for hypogonadism would be to stimulate the anterior pituitary gland to greater activity, and so indirectly stimulate the gonads. But a good technic for so stimulating the pituitary gland is not at hand. Thyroid medication does this to a moderate degree, but its effects are not dramatic. Substitution therapy for diminished anterior-pituitary activity, in the form of gonadotropic hormones, of anterior-pituitary-like hormone or of pregnant mare's serum concentrate, may have the effect of stimulating the growth of the testes temporarily, but it does not have the slow, prolonged influence of the pituitary gland itself. The anterior pituitary gland obviously has a very slow action. Nathanson, Towne and Aub² have shown its influence on androgen excretion as early as five years of age, with a gradual crescendo up to puberty. The gland therefore appears to have a prolonged stimulating effect, and similar sluggishness of effects should be expected from the physiological doses of substitution therapy. Of course, if larger doses are used, more rapid results are to be expected, though, like most effects of anterior-pituitary therapy, the active response may be of only a few weeks' duration.

The injection of testosterone or its esters has a more rapid effect, for this appears to be the activating hormone for the male secondary sex characteristics. Though it produces some of these effects in a period of weeks, it has no clear-cut stimulating effect on the testes themselves. There is, indeed, some evidence of a reverse effect, as judged by spermatozoa counts.

Hypogonadism in males demonstrates the most obvious effects of testosterone. McCullagh³ re-

cently published an excellent paper on the results of testosterone therapy in 6 cases of testicular deficiency at puberty. He showed that before treatment these patients excreted very little androgen in the urine, and that injected testosterone was promptly excreted, mostly within twenty-four hours. In cases of severe prepuberal hypogonadism he found that testosterone injections produced stimulation of all secondary sex characteristics in males, though prostate enlargement was the last to develop. The testicles did not seem to enlarge, but the number of spermatozoa did not decrease. The closing of bone epiphyses was not accelerated by testosterone—an observation of considerable significance in growing children.

McCullagh obtained good results in adult functional hypogonadism. In the adults treated by Nathanson and Aub,⁷ the results are equally striking. Erections and enlargement of the penis rapidly occur, followed by the growth of hair, changing of the voice and a moderate change in body configuration. The prostate enlarges to normal size as judged by palpation, whereas before treatment the gland could not be felt. Greater psychologic vigor and assurance are obvious, though these may well be purely psychologic responses to the physical changes.

Dunn⁸ confirms the stimulating effects on secondary sex characteristics, and also lays stress on the psychologic effects. He describes an improved mental concentration and interest in social activities, as well as improved physical energy and endurance.

The reports of Webster⁹ and of Eidelsberg and Ornstein¹⁰ are similar. The latter have administered testosterone for many months in the usual doses of 50 to 75 mg. per week. They have not observed a diminution in effect as the months go by, either in body changes or in an improved feeling of well-being and increased strength. Kearns¹¹ agrees as to the value of the drug when given intramuscularly, but also shows that it can be administered as an inunction in a greasy base. With the daily careful rubbing in of such an ointment, containing 4 mg., he obtained as satisfactory results as with injections. As proof of its absorption, he found increased androgen excretion in the urine.

All these dramatic effects appear to continue so long as testosterone therapy is maintained, and vary directly with the amount given. When therapy is stopped the eunuch returns in a period of weeks to his original state, though the deepened voice appears to be maintained.

It is to be expected that testosterone would be tried in many other conditions. Zehn¹² believes that daily 10-mg. injections of testosterone

constitute excellent treatment for benign hypertrophy of the prostate. This has also been reported by others, but not enough information has accumulated in regard to this difficult subject to warrant a conclusion as to its value.

USES IN FEMALES

Large doses of testosterone, like estrogens, apparently inhibit the production of sex-stimulating hormones by the pituitary gland so that uterine bleeding is inhibited. This results in an unstimulated ovary and hence a lack of secretion of ovarian hormones. Testosterone does not appear to have a depressing effect on the uterus itself¹³ in fact it exerts some stimulation directly even in ovariectomized females.¹⁴

The excellent result of the injection of testosterone at the menopause is a puzzling phenomenon, inasmuch as one would expect estrogens to be the drug indicated at that time. However, the work of Nathanson and Towne⁴ shows that in castrated women only a small quantity of injected testosterone is excreted in the urine as androgens. There is, on the contrary, a discernible increase in the total urinary estrogen output, and also a depressing effect on the pituitary gland, as evidenced by a decrease in the urinary follicle stimulating hormone. From its excretion products one must suspect that it is changed in part to estrogens. If one uses small, single doses, however, one may get other effects, as shown by Nathanson, Franseen and Sweeney¹⁵ in immature female rats. By the injection of a single dose of testosterone propionate there resulted a direct effect on the vagina, which produced a premature opening and an estrous response, as well as a direct effect on the uterus, and indeed an indirect stimulating effect on the ovary through stimulation of the anterior pituitary gland. It is the depressing effect on the pituitary gland of repeated doses that may account for the satisfactory effects it produces in the annoying symptoms of the menopause.

There is some evidence that testosterone also has an inhibiting effect on the peripheral female hormones, the estrogens. Thus Lipschütz¹⁶ has produced evidence that large doses of testosterone will inhibit the effect of Estradiol in castrated female guinea pigs, an effect characterized by an increase of weight, of musculature and of fibroids of the uterus. The use of testosterone propionate in the treatment of so-called essential dysmenorrhea, therefore, has some basis according to physiological knowledge. This type of pain, produced by contractions of the uterine musculature, seems relieved by the corpus-luteum hormone and intensified by estrone. Since testosterone appears an

antagonistic in some ways to estrone, there would seem to be some justification for its use in this syndrome. Rubinstein and Abarbanel¹⁷ found that it relieved most cases of essential, though it was not so helpful in anatomically determined, dysmenorrhea. Salmon, Geist and Walter¹⁸ also treated patients in this way. In 26 of 30 cases they obtained satisfactory results, and two thirds of the 25 cases followed for more than three months remained symptom-free. If 500 mg of testosterone propionate was given there was danger of hirsutism and change in voice, but the necessary dose is below this amount, and they recommend 250 to 350 mg., to be given during one cycle. They advance the theory that functional dysmenorrhea may be caused by an androgen deficiency.

Geist, Salmon and Gaines¹⁹ gave intramuscular injections of testosterone (300 to 1000 mg a month) for menorrhagia to patients who showed no gross evidence of disease. Bleeding stopped in 18 out of 20 cases, and uterine biopsies showed that this was usually accompanied by disappearance of the secretory phase, or even inhibition of the proliferative phase of the uterine endometrium. Menstruation, therefore, ceased, but within a month after stopping treatment the ovarian effects on the uterine mucosa again became evident and regular bleeding usually became re-established. These effects are again suggestive of the temporary inhibitory effect of testosterone on the sex stimulating hormones of the pituitary gland.

To 38 women with functional uterine bleeding, Mazer and Mazer²⁰ gave intramuscular injections of testosterone three times a week for from two to nine weeks. The total dosage per month ranged from 30 to 300 mg. A cure was considered to have occurred if the abnormal bleeding ceased and did not recur for at least four months after the discontinuance of treatment. By these criteria 68 per cent of the women were cured. It is interesting to note that the menstrual rhythm in the 30 patients who were menstruating regularly before the onset of the abnormal uterine bleeding was not disturbed.

MISCELLANEOUS USES

It would be natural to expect that testosterone with its suggestive antagonistic effects toward the estrogens would be effective in counteracting abnormal development of the breasts,²¹ and this should be particularly true in abnormal growth of the male breast. Hoffman²² tried such treatment in 28 males and found regression in 12 cases and a reduction of more than 75 per cent in 9 others, while in 2 cases there was complete failure. However, spontaneous regression occurred

in 3 untreated cases Wernicke²³ also tried this therapy in 4 cases, he obtained good results in 2, inasmuch as the gynecomastia disappeared, but there was a spontaneous recurrence in 1 case after therapy was stopped. On the other hand, Turner²⁴ did not find that testosterone influenced this condition in a man who had otherwise normal secondary sex development. It is important to remember that this disease improves spontaneously, and too much stress should not be laid, therefore, on improvement in a few cases. A larger amount of data is necessary before conclusions can be reached.

A more definite influence of testosterone on lactating breasts is indicated in a paper by Kurzkrok and O'Connell,²⁵ who treated 21 consecutive cases through early puerperiums in which lactation was considered undesirable. The patients were given repeated injections of testosterone propionate intramuscularly, usually in 25-mg doses twice a day until a total of 50 to 150 mg had been given. Only 2 of these 21 cases appeared to be treated unsuccessfully, and the symptoms associated with inhibition of lactation were relieved within twenty-four hours without the addition of any other therapeutic measures. As soon as complete relief of symptoms was obtained hormone injections were stopped, and no unpleasant aftereffects were observed.

This work has been confirmed by Beilly and Solomon,²⁶ who treated 108 consecutive postpartum cases with testosterone propionate. They obtained optimal results in 58 per cent and a lessening of milk production in 40 per cent, and the effectiveness did not seem to be related to the postpartum date of beginning treatment. They also found no deleterious effects from therapy, and no obvious breast-tissue changes were observed.

The use of testosterone propionate in the treatment of chronic mastitis was described by Spence.²⁷ He reports a relief of pain in 14 of 16 cases, and a reduction of the nodules in the breasts of two thirds of his patients. He used quite large doses of the drug and described, unfortunately, increased hirsutism in several young patients.

That testosterone will improve eczemas and psoriasis in women with menstrual disorders and in some men is asserted by Lafitte and Huret.²⁸

Arndt²⁹ claims that testosterone will give a prolonged improvement in patients with neurasthenia and in men suffering from intermittent claudication, even with early gangrene, and from angina pectoris. That about twelve injections of testosterone greatly improved—and indeed cured—many of the severe psychoses associated with the menopause is claimed by Weiss.³⁰

SUMMARY

From this report of the practical use of testosterone in clinical medicine it is obvious that the drug is a potent one, particularly in hypogonadism in males. In this condition its effectiveness as substitution therapy is uniformly accepted. For other diseases for which it has been recommended more careful observation is essential before definite conclusions can be reached. The evidence for its effectiveness in prostatic hypertrophy varies. Its use in females is the more interesting development of the last year or two, and at the menopause often seems to be even more effective in controlling vasomotor difficulties than are the estrogens. Its value in dysmenorrhea and abnormal bleeding is asserted, but needs further confirmation, and its help in drying up postpartum breast secretion has been confirmed with a reasonably large series of cases. It is therefore likely that in the next several years the use of testosterone for various abnormalities will become better established. This is not surprising, inasmuch as androgens are actively secreted, in both men and women, and probably purely by their antagonism to estrogens play an important role in hormonal control of the menstrual cycles. Of all the recent endocrine drugs, testosterone and its esters are at the moment the most interesting, as is well attested by the enormous number of publications appearing in regard to their use.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26211

PRESENTATION OF CASE

First Admission A fifty-seven-year-old Swedish cook was admitted to the hospital complaining of indigestion of some ten years' duration.

For ten years the patient had experienced transient, recurrent, increasingly frequent attacks of indigestion, associated with cramp-like pain in the epigastrium and right upper quadrant of the abdomen, often radiating to the right hypochondrium and mid-back. These attacks were precipitated by the ingestion of greasy or fatty foods and were accompanied by nausea, vomiting and a feeling of epigastric fullness with flatus. No jaundice, constipation, diarrhea, chills, fever, clay-colored stools, or dark urine was noticed until the last episode, the morning of admission to the hospital, when she ate a breakfast consisting of an egg, toast, butter and coffee with cream. A few minutes later a typical, severe attack ensued. However, the upper and right abdominal pain failed to remit with the usual remedy, namely, baking soda. At noon that day she experienced a severe shaking chill, which lasted thirty minutes. Because of these complaints she was brought to the hospital for treatment. The past and family histories were non-contributory. The menopause had occurred five to six years before admission. She had had no hot flashes, but had had two menstrual periods since that time, the last occurring eighteen months before admission. A uterine suspension with appendectomy was performed in an outside hospital twenty years before admission.

Physical examination revealed an obese, slightly pale woman who complained of pain in the right upper abdominal quadrant, where there was also localized tenderness with slight muscle spasm. No abdominal or pelvic masses were palpated. The remainder of the physical examination was essentially normal.

The temperature was 101°F, the pulse 108, and the respirations 28.

Examination of the blood showed a red-cell count of 3,500,000 with a hemoglobin of 90 per cent (Tallqvist), and a white-cell count of 13,000 with 75 per cent polymorphonuclears. The urine was negative, no bile being present. Stools were soft, formed and dark brown. The blood Hin-

ton test was negative. The van den Bergh test was 6.67 mg per 100 cc., with a biphasic reaction.

The temperature, pulse and respirations fell to normal levels on the day after admission, and except for slight jaundice which appeared and soon vanished, the patient's symptoms improved steadily. She developed a mild upper-respiratory infection, and on the seventh hospital day, when the latter had subsided, a laparotomy was performed under general anesthesia. On exploration of the abdomen the tubes and ovaries were normal to palpation. The uterus was found to have been suspended at the previous operation, but had remained adherent only on the right side. Exploration of the cecum revealed that the appendix had been removed at the previous operation. There were a moderate number of adhesions about the gall bladder, but no very marked signs of inflammation. This organ was removed, and the common duct was explored and drained. Many pigmented stones of various sizes were found in the gall bladder and common bile duct.

The patient enjoyed an uneventful postoperative course, and was discharged on the thirteenth postoperative day.

Final Admission (six months later) Following discharge from the hospital, the patient improved steadily and satisfactorily, but never quite regained her normal vigor. Approximately two months before the second admission she began to experience, for the first time, dull, aching pains in the right lower abdomen. These came and went, lasted a few minutes to an hour or two and recurred irregularly one to four times a day for a week or more at a time. The discomfort caused her little distress as it was never so severe as the pains she had experienced before the cholecystectomy was performed. About one month before admission she began to notice attacks of "indigestion," characterized by ill-described but apparently severe pain in the epigastrium, which radiated around the torso to the right back and sometimes to the left hypochondrium. These episodes usually occurred in the midafternoon and again in the early morning hours, and became so frequent that they were a daily occurrence. Relief from the discomfort was obtained by massaging the abdomen until vomiting followed. The vomitus was usually sour, rarely bitter, and at no time contained evidence of fresh blood. She became anorexic, noted increasing fatigue and torpor, and complained of constipation and gas, which were relieved only by oil or cathartics. She had lost about 6 pounds during the month before re-entry. She continued to work until two days before admission.

Physical examination showed a firm, tender, smooth, rounded mass, measuring about 10 cm in diameter, in the right lower quadrant. It shifted with respiration and by palpation in a cephalad or caudad direction, and was definitely outlined by the examining hand.

The temperature, pulse and respirations were normal.

The blood showed a red-cell count of 4,340,000 with 13.6 gm hemoglobin (photoelectric-cell technique), and a white-cell count of 7500 with 58 per cent polymorphonuclears. The urine was negative. The stools were brown, soft, formed and guaiac positive.

A barium enema passed to a point just above the cecum that corresponded to the upper border of the palpable abdominal mass. At this point a temporary delay was noted, and the barium was seen to pass suddenly into the cecum and ileum. A rounded mass was seen projecting upward into the ascending colon, and the ileum lay in the center of this mass. The ileum was slightly dilated, its margins were irregular, and there was complete absence of the mucosal markings. There also appeared to be destruction of the colonic markings around the ileocecal valve. The cecum was reduced to a small crescentic cavity lying along the lateral margin of the mass. After evacuation the appearance was much the same except that the upper margin of the mass projecting into the colon was better demonstrated. Filling the colon with air gave no additional information.

On the sixth hospital day, an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. JAMES E. FISH The question immediately arises in a situation of this sort as to whether the secondary condition which brought about the re-entry co-existed at the time of the original entry, or whether it developed as a complication of the first condition or perhaps as a complication of the operation. A mass appearing in the abdomen a matter of months following an abdominal operation, of course, makes us think of the possibility, even though we do not believe it is likely, of a sponge that had been left in the abdomen. We can assume that the "sponge count" was correct. Furthermore, the sponges at the Massachusetts General Hospital have attached to them a metal clip, hence, a sponge in the abdomen would show immediately on x-ray examination with a flat plate. Furthermore, the mass described by x-ray does not suggest that sort of complication. So I think we can rule out any such possibility as a cause for this mass in the right lower quadrant.

In summary of this rather long history, I am

inclined to believe the first episode was a clear-cut attack of choledocholithiasis. The fever and chill in the absence of more marked evidence of inflammation in the gall bladder are undoubtedly accounted for by some slight degree of liver involvement—a cholangitis. She had a severe chill on the first admission to the hospital, and a van den Bergh that might suggest liver damage. The finding at operation of small stones in the common duct as well as in the gall bladder is certainly in keeping with such an assumption. It therefore seems proper to discard the first operation as having any direct relation to this second episode. The first operation, therefore, becomes of interest to us only from the point of view of knowing whether the cecum was perfectly normal at the time of the abdominal exploration or whether some lesion was present but overlooked.

Let us run through some of the symptoms. We notice that the patient did very well for four months—another fact that certainly is against any complication from the operation. Then after four months she began for the first time, to have dull aching pain in the right lower abdomen. This came and went. It is not described exactly as peristaltic pain, and yet it does suggest that type of pain. A little farther on we get additional information about the pain, namely, that it was severe in the epigastrium and that it radiated around to the back and sometimes to the left hypochondrium. The pain is not exactly typical of small-bowel pain but certainly is not inconsistent with it in the presence of partial or intermittent obstruction. I can attach no significance to the fact that the pain occurred in the midafternoon or early morning hours. There was a progressive factor in that the pain became more and more frequent until it was a daily occurrence. The patient obtained relief by massaging the abdomen. That is an extraordinary observation, if correct, and it would seem to fit into the ultimate picture. Whether she obtained relief by the vomiting that followed or whether she in some way displaced the tumor mass in the abdomen by massage is not clear. I cannot attach any particular significance to the type of vomitus. We now note the presence of constipation and gas. These additional symptoms plus nausea and vomiting are common symptoms of intestinal obstruction, even in a mild degree. She lost some weight,—6 pounds during the month before admission,—and yet with all this partial intestinal obstruction the individual was well enough between episodes so that she continued to work," confirming the impression that her difficulties were due to partial and intermittent obstruction.

On physical examination she had a fairly sized

ble tumor—the size of a man's fist, it shifted with respiration and, still more important, it shifted in an up-and-down direction on palpation. Apparently it did not shift laterally very much. That would suggest that it was in the cecum, since the cecum, being tied down unlike the small intestine with its longer mesentery, might only move up and down in this manner. If it were a mass in the small intestine it would move more freely in all directions. Furthermore, the lack of more pronounced fixation would suggest that the tumor was not retroperitoneal. We note further that the temperature, pulse and respirations were normal and that the white count was fairly low. This is all very strong evidence against the presence of an inflammatory mass. The positive guaiac test is important, but not especially diagnostic. It suggests, certainly, an erosion or break in the lining of the mucous membrane, but we do note positive guaiac tests in the stools even with inflammatory processes outside the bowel wall. I even remember positive guaiac tests in several cases of appendiceal abscess. From the description of the barium enema we certainly get the impression that the mass surrounded the end of the ileum projecting into the bowel and that brings to my mind particularly the thought of an intussusception of the ileum into the cecum. A little farther along we note that the mucosal markings in the terminal ileum were absent. That would suggest some sort of an infiltrating process, neoplastic or inflammatory, that had eradicated those markings. The description of the mucous membrane that was noted in the x-ray examination in the cecum is further evidence but does not help in the differentiation between an inflammatory and a neoplastic process.

Are the x-ray films available?

DR. AUBREY O. HAMPTON: The question of a sponge was raised and plain films were taken, but they do not show a clip such as the Massachusetts General Hospital sponges contain. Furthermore, no dilated loops of small bowel were seen, nor was there other evidence of obstruction. The film taken at the time of the barium enema shows a rather unusual picture, this being the cecum and this the terminal ileum. The terminal ileum shows definite ulceration, which ends abruptly at the margin of the mass. This smooth concave margin of the cecum represents the point of invagination into the cecum, and the mucosal folds in this area appear normal. The point at which we suspected destruction of the mucosal folds is immediately around the ileocecal valve. The abrupt ending of the process would probably help rule out ileitis or tuberculosis.

DR. FISH: It seems to me that we have a good

deal of evidence against an inflammatory process, and I might say further that a primary intussusception would hardly be considered in this situation. In the first place, for an adult to have primary intussusception is an extraordinarily rare phenomenon, and the intussusceptions that do occur are more apt to be of a type associated with chronic and intermittent low grade obstruction of this sort. The primary lesion leading to the intussusception might be inflammatory, such as regional ileitis or tuberculosis. However, in inflammatory lesions of the ileum rarely are the cause of intussusception. That leaves us with the conclusion that the primary process must have been neoplastic. Of the possible neoplastic conditions we might mention a benign neoplasm of the small bowel, but the length of involvement of the ileum is distinctly against that sort of thing. I think carcinoma is unlikely, and it seems to me that the diagnosis boils down to a lymphoma with secondary intussusception of the terminal ileum into the cecum.

DR. WILLIAM B. BREED: What about the possibility of a benign polyp associated with intussusception?

DR. FISH: I am of the opinion that such was probably not the case, in view of Dr. Hampton's statement regarding destruction of the mucosal markings over such a length of terminal ileum.

DR. HENRY H. FAXON: There are three points of interest to bring out. In the first place, the gall-bladder incident is of interest only as it gave a chance to see what the cecum was like a relatively short time before the terminal illness. At the first operation I exposed the cecum, and am sure that nothing abnormal was present on palpation or inspection.

Secondly, the history is misleading in that it lays a good deal more emphasis on the symptom of pain than was brought out when she first came to see me. The chief thing that bothered her was the lump in the side that she herself had discovered.

The third point is that it was surprising, after the true state of affairs had been found out, she did not have more in the way of obstructive symptoms. At operation it was discovered that a large segment of the terminal ileum had intussuscepted into the cecum. Adherent to it, not by inflammatory reaction but by actual invasion of the growth, were loops of small intestine. A first stage ileotransverse colostomy was done, and I was later able to resect the right colon and small intestine en masse. She did well immediately following operation but then developed intestinal obstruction and a fecal fistula and finally died.

about ten weeks after operation, primarily from inanition because I was unable, even at a third attempt, to isolate and close this fistula.

PREOPERATIVE DIAGNOSIS

Malignant lymphoma of terminal ileum

DR. FISH'S DIAGNOSES

Lymphoma of terminal ileum
Secondary intussusception into cecum

ANATOMIC DIAGNOSIS

Reticulum-cell sarcoma of ileum

PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY The differential diagnosis here was essentially that of a neoplasm that would develop as rapidly as this, assuming that the first exploration was adequate, and I think we can safely assume there was no tumor present at that time. Five months later there was a tumor of sufficient size so that the patient could feel it herself. The microscopic examination shows that it was a form of lymphoma which we classify as reticulum-cell sarcoma, a rather frequent type of lymphoma to be found in the bowel. The primary tumor was apparently in the ileum which was most extensively involved. Besides the intussusception there was considerable neoplastic invasion of the cecum, as well as some involvement of another loop of small bowel, so a very extensive operation was necessary.

DR. MAURICE FREMONT-SMITH There was no evidence of reticulum-cell sarcoma elsewhere?

DR. MALLORY No.

DR. J. H. MEANS Was it an annular growth?

DR. MALLORY Yes.

One question came up a few months ago in a similar case of intussusception of the ileum into the cecum. Dr. John Homans was present at the conference, and I asked him if he had ever seen intussusception in a case of regional ileitis. He said he had not. That is also our experience. We have found it quite common in association with tumors but extremely rare in association with inflammatory lesions.

DR. HAMPTON Another important point in differential diagnosis which I failed to mention was that the ileum at the site of the disease was larger than normal. In cases of regional ileitis it is small.

DR. FREMONT-SMITH Was the patient too old for a regional ileitis to occur?

DR. MALLORY I do not believe I have seen ileitis this late in life.

CASE 26212

PRESENTATION OF CASE

A thirty six year-old American housewife entered complaining of shortness of breath and edema.

Approximately two and a half years before admission the patient began to notice increased breathlessness on exertion especially after climbing stairs. This dyspnea increased progressively until admission so that she could walk only about five or ten yards on the level without becoming markedly out of breath. It had been especially marked during the past year. She stated that very often "everything went black" after the slightest exertion. Four months before entry her ankles began to become swollen toward the end of the day, but the swelling disappeared after a night's rest. During the two weeks prior to entry the swelling had become much more marked, especially on the right. During this four month period she had been in bed practically all the time. One month before entry she noticed a swelling over the lumbar region, which appeared after she had been propped up in bed for some time. It disappeared when she lay down and reappeared when she was propped up again. Three months before admission she had had an attack of tachycardia which lasted from 6 a.m. to 1.30 p.m. and during which she had to fight for breath. Since then she had had two or three similar attacks of a milder nature, the last one occurring about one week before entry. During the month before entry her abdomen had become distended and she felt uncomfortable when she lay on her left side. She had also had nausea and occasional vomiting. During the previous two months she had been using two pillows. Since the onset of the shortness of breath two and a half years before she had had a dry, hacking, unproductive cough especially following exertion. This had not changed in character.

The family history was noncontributory.

She had been married eleven years. The husband was living and well. Her first pregnancy which had occurred ten years before entry, terminated at seven months as a result of toxemia. Two years later she had had a miscarriage at three months, and two years after that another child had died as a result of toxemia during the eighth month. Curettages had been performed four and two years before entry.

She had the usual childhood diseases. There was no history of pneumonia, pleurisy or rheumatic fever. There had been no contact with tuberculosis. She had had several severe sore throats before the age of twenty five, and a tonsillectomy had been performed twice. Since then she had had no sore throats.

Physical examination showed a rather thin but fairly well-developed woman sitting propped up in bed and having a little difficulty in breathing and an occasional dry cough. The lips and fingertips were slightly cyanotic. The left fundus showed a bluish-gray rim about the nerve head, slightly suggesting a partial separation of the retina. The heart was greatly enlarged. The maximum apical impulse was felt 14 cm to the left of the midsternal line in the fifth interspace, 6 cm beyond the midclavicular line. There was no heave of the precordium, and no thrill was palpable. The sounds were loud and of good quality. The rhythm was regular. The pulmonic second sound was greater than the aortic. There was a low-pitched diastolic rumble extending through diastole and ending in a crescendo in the first sound at the apex, best heard in the axilla. A high-pitched short systolic blow and a soft systolic blow were heard over the base. The pulses were equal and of small volume. The neck veins were moderately engorged and showed visible pulsations. The blood pressure on the right was 106 systolic, 92 diastolic, and on the left 126 systolic, 118 diastolic. The chest showed dullness at both bases, with moist rales extending to the midclavicular regions. The liver was felt 9 cm below the costal margin in the right midclavicular line, and was firm and tender. The abdomen was distended, and dull in the flanks, and a fluid wave could be demonstrated. The veins were prominent. The tip of the spleen could barely be felt. There was slight pitting edema of the feet and shins, and moderate edema of the sacrum.

The temperature was 98°F, the pulse 72, and the respirations 22.

The urine showed a specific gravity of 1.008 to 1.010, a slight trace of albumin and a sediment which contained an occasional white blood cell. The blood showed a red-cell count of 5,190,000 with a hemoglobin of 85 per cent, and a white-cell count of 13,000 with 78 per cent polymorphonuclears. The stools and sputum were normal. The venous pressure in the right arm by the direct method was 18 cm. The nonprotein nitrogen of the blood was 50 mg per 100 cc, the serum protein 6.2 gm.

X-ray examination of the chest showed that both sides of the diaphragm were obscured by homogeneous dullness which rose in the axillary line to about the middle of the scapula. The heart shadow was difficult to outline, but the heart was enlarged both to the right and to the left. The upper left and right borders were unusually prominent. The blood vessels of the lung were large. There was extension of the dullness at the right base into the region of the interlobar pleura.

On the second day the blood pressure in the left arm was 105 systolic, 95 diastolic, and in the right, 110 systolic, 90 diastolic. Further observation showed that the heart apparently shifted several centimeters with changes from the left lateral to the right lateral position. The liver edge was felt 12 cm below the ensiform and the same distance below the right costal border in the nipple line. There was no Broadbent sign. The patient was given 1½ gr of digitalis three times a day. The fluid intake was limited to 1200 cc daily. She was also given Salyrgan, without appreciable effect. She continued to cough considerably, and there was an acetone odor to the breath. Southey tubes were inserted for nine and a half hours on the twelfth day. Approximately 2000 cc of fluid was removed. The tubes were used again about one month after entry. During the fifth week she gradually became drowsy, developed increasing pallor and showed distinctly icteric sclerae. On the fortieth day, after a visit from her husband, she suddenly gasped and died in a few minutes.

DIFFERENTIAL DIAGNOSIS

DR J SYDNEY STILLMAN. It seems clear that we are dealing here with a patient who died from heart failure. The problem is to determine as accurately as possible the nature of the pathologic changes which led to it.

The patient's history before the onset of the present illness gives some leads, but that is all. She had had two attacks of toxemia of pregnancy, leading to premature delivery in the first pregnancy and a dead baby at eight months in the third. The second pregnancy resulted in a miscarriage at three months, too early for the onset of toxemia. Two curettages, which I assume to have been therapeutic abortions, were done thereafter. The attacks of toxemia might well have led to the development of hypertension and hypertensive heart disease.

The patient had "several severe sore throats" before the age of twenty-five, apparently severe enough to lead to two tonsillectomies. There is no history of rheumatic fever, but only too frequently one finds rheumatic valvular disease without a definite history of an active rheumatic process.

The final illness began two and a half years before entry and consisted essentially of a slow, steady, progressive failure of the left heart for a little over two years, then, four months before entry, right-sided failure began. In spite of bed rest, digitalis, diuretics, restriction of fluids and Southey tubes the patient failed to rally and died on the fortieth hospital day. Unfortunately, we are not given the help of blood-pressure determi-

nations or auscultatory examinations of the heart previous to admission to the hospital.

Physical examination revealed slight orthopnea, cyanosis of the fingers and lips and an occasional dry cough. There was a suggestion of a partial separation of the left retina, probably a scar of the toxemia of pregnancy. The heart was greatly enlarged. The sounds were loud and of good quality. The rhythm was regular. The murmurs of mitral stenosis and regurgitation were present. There is a meager description of a systolic murmur at the base. The pulse pressure and systolic pressure were low, with the diastolic pressure elevated or high normal. The signs of hydrothorax and pulmonary edema are evidence of left-sided heart failure, and the cyanosis, engorged neck veins, enlarged liver and spleen, ascites and peripheral edema show marked right-sided failure.

A diagnosis of rheumatic valvular disease with mitral stenosis and regurgitation seems justified. It is hard to evaluate the systolic murmur at the base. Although it might well be caused by a slight degree of aortic stenosis, which would be supported by the decrease in intensity of the aortic second sound, it seems quite likely that it was due to a dilatation of the heart and was really a functional murmur. It does not seem necessary to have had tricuspid stenosis to account for the findings in this case, and against it are the lack of the characteristic murmurs and of pulsation of the liver. Although a subacute or chronic active rheumatic disease would lead to the relentless course this patient ran, there is no evidence to point to its existence.

Because of the marked degree of obstruction to the return of blood to the heart, the low blood and pulse pressures and the progressive course without response to the usually effective means of therapy, adhesive pericarditis must be considered. It is obvious from the statements about the shift in position of the heart with changes in position and the absence of Broadbent's sign that this diagnosis was considered by the visiting staff. In addition to the two findings just noted there are other features which make this diagnosis unlikely. First, if one accepts the diagnosis of rheumatic valvular disease, which seems advisable, the diagnosis of adhesive pericarditis is unlikely. In 15 cases of the disease reported by Dr. Paul D. White¹ and 19 cases reported by Dr. C. Sidney Burwell² there was no evidence that associated rheumatic heart disease or rheumatic fever played a part in the etiology. In 1000 cases of rheumatic heart disease followed at the House of the Good Samaritan there were no cases of adhesive pericarditis. Furthermore, if one does not accept the diagnosis

of rheumatic mitral disease one cannot explain all the murmurs. Second, the heart was larger than that found with adhesive pericarditis. Third, there was no evidence of tuberculosis, a common cause.

One must consider the possibility of hypertensive heart disease, either acting as the single cause of this patient's death or existing in conjunction with rheumatic valvular disease. The first possibility seems unlikely because of the presence of an apical diastolic murmur, the extremely large heart, the absence of any abnormally high blood pressure reading or the history of one, the absence of vascular changes in the ocular fundi, the two-year history of progressive left-sided heart failure before the right side failed and the degree of venous obstruction.

Is it possible that the patient developed hypertension six to ten years before entry—that is, after the toxemia? It seems quite likely because she developed toxemia in the two pregnancies that lasted into the third trimester. Furthermore, Fishberg³ says that essential hypertension develops with remarkable frequency in middle-aged women with mitral stenosis. It is possible that hypertension existed in this patient until a dilatation of the heart occurred and that the latter contributed to the marked degree of congestive failure. The high diastolic pressure and low specific gravity of the urine, with a slight trace of albumin favor this hypothesis. However, a fall of pressure from an abnormally high level to an abnormally low one would seem more likely to have been a terminal event. The combination of mitral stenosis and hypertension frequently leads to auricular fibrillation, which this patient did not have unless the attacks of transient tachycardia were caused by paroxysmal auricular fibrillation. Furthermore, the association of these two conditions does not seem unfavorable.

In summary, I believe that this patient had rheumatic heart disease with mitral stenosis and regurgitation and possibly a slight degree of aortic stenosis. Pathologically, I should expect to find some changes in the kidneys and arterioles suggestive of essential hypertension. However, I do not believe that essential hypertension played more than a supporting role in this patient's illness. The jaundice terminally I believe, was due to chronic passive congestion and central necrosis of the liver. I doubt the existence of true cardiac cirrhosis.

CLINICAL DIAGNOSES

Rheumatic heart disease, with mitral stenosis.
Cardiac decompensation
Cardiac hypertrophy

DR. STILLMAN'S DIAGNOSES

Rheumatic heart disease, with mitral stenosis and regurgitation
 Aortic stenosis, slight?
 Congestive heart failure
 Chronic passive congestion of the liver, with central necrosis
 Arteriolar sclerosis

ANATOMIC DIAGNOSES

Endocarditis, chronic rheumatic, with stenosis, mitral
 Cardiac hypertrophy, rheumatic
 Pulmonary embolus, right
 Pulmonary infarct, right lower and middle lobes
 Bronchopneumonia, right, slight
 Hydrothorax right, marked, left, slight

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY I should like to start by apologizing to Dr Stillman for what I believe is a serious omission from the abstract of this patient's record. The initial temperature was as reported, 98°F, and subsequent recordings for the next five days ranged from 96 to 98 by mouth. As soon as a shift was made to rectal temperatures, however, it was discovered that the figures ranged constantly between 100 and 101°F, with occasional spikes to 102. She did, therefore, have a low-grade fever accompanying the leukocytosis.

Dr Stillman was, of course, correct in his primary diagnosis of rheumatic heart disease with mitral stenosis and regurgitation. The valve leaflets were markedly thickened and interadherent, and the cords so shortened that the apices of the papillary muscles were virtually in contact with the valve margins. The other valves were negative. The heart was markedly enlarged, showing moderate hypertrophy and great dilatation of both auricles and of the right ventricle. In fact the pulmonary conus was in itself almost as large as the left ventricle. Despite the marked dilatation of the right ventricle, its wall measured 8 mm in thickness.

This, however, was not all the story. The right pleural cavity showed, as the x-ray film suggested, a considerable amount of fluid, just under 1000 cc. In addition, however, there were two very large

pulmonary infarcts, one occupying two thirds of the lower lobe, and the other almost all the middle lobe. In the corresponding branches of the pulmonary artery were grayish-red, firmly adherent thrombi, which had evidently been present for a period of some weeks. Microscopic examination of the pulmonary infarct showed a marked leukocytic reaction and beginning encapsulation at the periphery, suggesting a duration of approximately a month. Sections of lung tissue outside the areas of infarction showed considerable thickening of the small pulmonary arterioles of the type frequently seen in mitral stenosis. From the anatomical point of view the degree of cor pulmonale was greater than that which mitral stenosis alone would explain, a finding suggestive of considerable resistance within the pulmonary arterial tree itself.

We are constantly becoming more aware of the importance of pulmonary embolism in cardiac patients. Dr White has recently called our attention to the fact that decompensation alone is not an adequate cause for fever or leukocytosis. Unsuspected pulmonary infarction is one of the factors which can frequently be shown to be responsible for such a reaction. In the diagnosis of pulmonary embolism we always lean heavily on the x-ray examination. It is worth remembering, however, that, as in this case, an accumulation of fluid may make x-ray diagnosis difficult or impossible and Hampton and Castleman⁴ have shown that pleural effusion not infrequently accompanies pulmonary embolism and infarction. One point which justifiably might have aroused Dr Stillman's suspicion was the appearance of jaundice. It is quite true that it can be explained purely on the basis of passive congestion of the liver, but it is much commoner in association with large pulmonary infarcts. Unfortunately the postmortem examination was restricted, and therefore I cannot report on the kidneys. In view of the repeated toxemias, it would have been extremely interesting to have examined them.

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LODGE MEDICAL BILL

On March 19, Senator Henry Cabot Lodge introduced a bill (S 3630) to amend the Social Security Act. The first part of this bill provides for the furnishing of funds up to \$40 per year for medical, dental and hospital services to unemployed persons who are receiving unemployment insurance benefits or to members of the families of such persons. It specifies that services of any legally practicing physician or dentist to eligible people shall be paid for, but in the case of hospitals makes a distinction between "profit" and "non profit" institutions. A result would be that, in the case of a doctor owning a hospital and practicing in it, the doctor could be paid for his professional services, but not for the services of his hospital. Whether this is a proper distinction, or an important one need not be discussed. The second

part of the bill provides funds for the states to match and expend, through suitable organizations, for the purpose of furnishing x-ray treatment, respirators and certain drugs, hormones, vitamins and vaccines for the indigent. In connection with this section several parts merit discussion.

As is obvious from Senator Lodge's discussion of his bill (*Congressional Record* 86 4702-4705, 1940), he intends that the bill provide for x-ray examination rather than x-ray treatment. He stresses that many poor people need x-ray examinations early in some illnesses, but do not secure them because of the cost. The problems that arise because x-ray examinations rather than other medical examinations are to be furnished seem interesting. Theoretically and practically the section of the public that is eligible for this aid will tend to go to the roentgenologist rather than to the general doctor, and there will be a great tendency for people to demand x-ray examinations that any doctor knows would have very little or even no chance of showing information of value to the patient.

In regard to the furnishing of drugs, Senator Lodge wants to provide especially the more expensive medicines such as insulin which perhaps are not always available to poor people in certain areas. As a matter of fact a leading medical social worker in Boston has stated that her department has a very difficult time getting various welfare departments to furnish liver extract insulin and so forth to many recipients of aid who need such drugs to maintain life. In the case of people not on relief rolls there is no way of obtaining such medicines except through their own efforts or the aid of private charity. This is an attempt to solve a relief problem that is theoretically correctable by intelligent administration to each local relief organization. That such provisions should be needed in any part of the country is somewhat of a reflection on these organizations.

An interesting feature of the bill is that it would take money from social security funds and use it in the care of the indigent without regard to whether the individuals benefiting had ever contributed to the funds. Inasmuch as the social-

security funds are raised by a tax on the wages of workers and a pay-roll tax on their employers for the purpose of providing for the former in their old age, it is questionable how much of this money should be diverted to other purposes (Such diversions are not new, but whether they are justifiable is a moot point) If local medical care of the unemployed and indigent needs financial support from the Federal Government, and many people think it does, would it not be better to face the fact frankly and appropriate money raised by general taxes rather than take money from social-security levies? This bill in final analysis would put the Federal Government into the field of curative medicine. It would do something to alleviate two situations that have arisen only where and because local medical care for the unemployed and indigent has been either inefficient or absent. Although it is in no way comparable in size and in method of administration with the Wagner Bill, it is like the latter in taking into the province of federal administration what has always been a local function.

Why are such bills introduced? Some lay the blame to a large extent on the members of the medical profession. Who, better than they, should know the difficulties the poor have in getting good medical care and in buying lifesaving medicines? But, on the other hand, just how much has each doctor done to secure humane, efficient poor laws, to ensure the election of intelligent, honest local governments and the appointment of proper administrators and employees in welfare departments and to inform welfare departments in regard to proper methods and policies in providing the medical aspects of relief for the indigent? More individual effort along these lines is desirable and would do much in correcting a state of affairs that is at least partly responsible for the public clamor for "state medicine."

MILITARY MEDICINE

TRAUMA as a cause of disability is constantly growing more important with the increasing mechanization of civilization, and the surgical treatment of injury produced by physical agents is a

vital factor in modern medicine. Such injuries often concern young vigorous adults not formerly a large group in the doctor's consulting room. Furthermore, the physician's activities are more and more concerned with youth and old age, and he meets those in the former group primarily for prophylactic measures against diseases that many younger physicians have only rarely seen. At no period in the world's history has medical practice so closely approximated conditions and problems formerly seen only in war time. An unusual number of articles on the treatment of individuals in the mass are written. As general health and prophylactic measures increase in number, the practicing physician is forced in increasing degree to consider problems highly similar to those of the military surgeon.

Opportunities for the study of traumatic surgery and mass public-health measures are available in highly specialized courses. Rarely are short summaries of recent advances and modern attitudes in these fields available to the practitioner of medicine. Such a course is now available in the curriculum of the Courses for Graduates at the Harvard Medical School as the course "Military Medicine and Surgery." It is open to all medical reserve officers of the United States Army and provides professional information in just those fields which are difficult for the practitioner to cover in a short time by any other means.

It is evident that the value of a well trained medical personnel is highly important to every country. The balance of international politics is so precarious that anything may happen. Isolation from the present conflict unfortunately is not accompanied by insulation, and despite overwhelming desires, this country may become involved. If this becomes the case, it seems inevitable that a considerable military effort will be the result. Even now, the modest expansion of the Army has produced calls for reserve personnel. For doctors who hold commissions as reserve officers it becomes their duty to themselves and to the profession they represent to be, at all times, prepared for immediate efficient professional service, and for this purpose, courses such as the one here mentioned

are being conducted at various places throughout the country

The course at the Harvard Medical School will be given during the first two weeks in June. A concise and up-to-date consideration of general problems in medicine and surgery—with particular emphasis on preventive measures, treatment and trauma—cannot fail to be advantageous. The development in these fields is sufficiently rapid to make it almost mandatory for the practitioner of medicine who is a reserve officer to take advantage of the opportunity to secure valuable postgraduate instruction.

MEDICAL EPONYM

BRODIE'S ABSCESS

Brodie's original description of the abscess bearing his name was published in 1838 or possibly somewhat later. The following quotation is taken from pages 395-411, "On Chronic Abscesses of the Tibia," in a volume, *Lectures Illustrative of Various Subjects in Pathology and Surgery* (London: Longman, Brown, Green and Longmans, 1846) by Sir Benjamin C. Brodie (1783-1862), sergeant surgeon to the Queen. These lectures were given to the students of St. George's Hospital.

When the tibia is enlarged from a deposit of bone externally when there is excessive pain such as may be supposed to depend on extreme tension the pain being aggravated at intervals, and these symptoms continue and become still further aggravated, not yielding to medicines, or other treatment that may be had recourse to, then you may reasonably suspect the existence of abscess in the centre of the bone.

R W B

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., Secretary
330 Dartmouth Street
Boston

PYELITIS OF PREGNANCY

Mrs. C. M., a twenty-five-year-old primipara, when six months pregnant, entered the hospital on September 3, 1935, with a history of right-sided pain on and off for a month and a half, associated during the previous two weeks with oc-

casional chills and fever, urgency, frequency and dysuria. She had had six days of conservative treatment in another hospital without noticeable effect.

The family history was irrelevant. The patient's past history was non-contributory. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted four days without discomfort. Her last period was March 1, making the expected date of confinement December 8.

Physical examination on admission showed a well-developed and well-nourished young woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. There was marked tenderness over the right kidney. The uterus was enlarged to a size consistent with the period of amenorrhea and the fetal heart was present. A urine sediment showed large numbers of white blood cells in clumps, but no casts or red cells. A culture showed *Bacillus coli*. A blood examination on September 3 showed the hemoglobin to be 65 per cent, the red-cell count 3,920,000, and the white-cell count 24,200. A diagnosis of pyelitis was made.

On September 6 the temperature rose to 104°F. The treatment was supportive and symptomatic for nine days, but as it was thought that this treatment was of no avail and as a white-cell count on September 12 was 16,400, a cystoscopy was performed. As the urine from the right ureter contained many leukocytes, the right renal pelvis was irrigated with boric acid solution. A ureteral catheter was left in situ until September 15, when the temperature was normal.

The patient was discharged on September 21, asymptomatic. No further history on this patient could be obtained.

Comment. This case represents the scientific and rational treatment of pyelitis. A culture of the urine yielded *B. coli*. When constitutional treatment proved unavailing, the infected kidney was catheterized and irrigated and a catheter left in situ for three days, with apparent cure of this particular attack of pyelitis.

HAY FEVER*

Hay fever is a condition in which there is an irritation of the mucous membranes or the inner linings of the nose, throat and eyelids. The defensive mechanism against an irritation of the throat is coughing, against an irritation of the eyes is tearing or watering and against one of the nose is watering and sneezing. All these are attempts to expel the mechanical irritant. If the irritant, such as a pollen granule, is composed of irritants which are capable

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

A "Green Light to Health" broadcast given by Dr. L. Chandler Walker on Tuesday, April 16, and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

of being dissolved by the watery secretion of the membranes, these soluble substances prolong the symptoms already mentioned, and in addition, cause itching and local swelling of the membranes. Anybody whose membranes are irritated by soluble irritants, and these are usually proteins, is designated as sensitive or allergic to those substances.

When one is subject to symptoms of hay fever more or less continuously or spasmodically throughout the calendar year, the term perennial hay fever is used. To determine the cause of this condition a detailed and searching history as regards the symptoms is very important. Occupation, exposure to dust, gases, odors, smoke and animals, the presence of pet animals or birds in the home, exposure to face powders, shaving powders, face lotions, very fragrant perfumes, flowers and soaps, exposure to frequently repeated sudden variations in the temperature, and the ingestion of beverages and drugs, all may be causes of perennial hay fever and may be suspected from the history of the individual. Foods also are a common cause of this type of hay fever, and tests may be done in order to determine whether they are implicated.

The simplest test, called the scratch test, consists of applying small amounts of specially prepared food substances to individual slight scratches on the forearm, to which is added a liquid to dissolve the food and permit of its absorption through the broken skin. If after an interval of fifteen to thirty minutes, a small raised blister, like a mosquito bite, appears at the site of any scratch, it is concluded that the particular food which was placed on that scratch is harmful to the individual and is probably the cause of hay fever. This test is also helpful for animal hair and skin scalings, for face powders, for feathers and for pollens.

The most prevalent kind of hay fever is seasonal in type, and the symptoms are limited to one or more of the warm seasons of the year. Pollens are chiefly responsible, although the various causes which I have mentioned for perennial hay fever may be secondary to or a complication of the pollen sensitization.

Pollens are divided into two classes, namely, those that are carried by insects and those that are borne by the wind. It is the wind borne group of pollens that cause hay fever. Another statement that is simple and nearly accurate is the following: the pollen of any tree, shrub or plant whose flower is highly scented or brightly colored rarely causes hay fever.

Here in New England we recognize three hay fever seasons: the early spring season, during late April and May, the early summer season, extending from late May to the middle of June, and the late summer or autumn season, which begins about the middle of August and extends to the first heavy frost. During the spring season tree pollens are the cause of hay fever. The birch and oak are the worst offenders, because they shed a large quantity of pollen over a period of ten days to three weeks. The willow and poplar also shed a large quantity of pollen, but only for a period of a few days. The various grasses are the cause of the early summer type of hay fever. It is from matured grass or hay, which was first recognized as a cause of symptoms, that the term hay fever is derived. June grass which pollinates in late May often causes a short attack of hay fever. Timothy grass is the chief cause of hay fever from early June to the middle of July. Other grasses either grow too sparingly or produce too small a quantity of pollen to be considered a prominent cause of hay fever. During the autumn season, in localities north of Connecticut, we are chiefly concerned with the pollen of small type ragweed.

Pigweed, plantain and other members of this botanical family may rarely be a cause of irritation.

Treatment of the perennial type of hay fever consists primarily in the avoidance of the causative irritant. A food may be avoided, a floss or kapok pillow may be substituted for a feather pillow, a pet animal may be dispensed with, a non-irritating face powder, shaving powder or soap may be substituted for an irritating one. Where dust cannot be avoided, a mask may be worn over the nose and mouth.

A sea voyage is the only sure way of avoiding all kinds of pollens. Ragweed, however, is unknown in Europe, South America and Bermuda.

Fortunately, pollen hay fever may be treated satisfactorily. The treatment consists of a series of inoculations containing the causative pollen. After this pollen has been ascertained by skin tests, further ones are made with a series of dilutions of the pollen, these dilutions range from a strong solution of the pollen to a very weak solution. By this dilution test, it is possible to determine to what strength of pollen solution a person is sensitive, it might be considered more or less a tolerance test. This test is very important in that it determines what strength of pollen is safe to use to begin treatment. Furthermore, from this test may also be estimated the total number of treatments that are desirable.

The most generally used method of treatment is to begin inoculations about fifteen weeks prior to the usual onset of symptoms, and to give one inoculation each week up to the beginning of the pollen season. Each succeeding treatment is progressively stronger than the preceding one so that the tolerance to the pollen protein is greatly increased. The results from this method of treatment are usually excellent for the ensuing season, and if a similar series of inoculations are given for several successive years, there is a probability of permanent cure.

Overindulgence in certain foods that are closely related botanically to a pollen that causes hay fever may aggravate hay-fever symptoms during that particular pollen season. For example, the ingestion of large amounts of the cereal grains, such as white flour, by a person who is sensitive to and has hay fever from grass pollens, may increase the hay-fever symptoms. Naturally, a reduction in the quantity of the cereals taken in the diet is indicated.

Air-conditioning and air filtration of the sleeping room give a great amount of relief to those who are especially troubled at night. In fact one would have no hay fever if he spent the entire pollen season in such a room. Nasal filters are very helpful during the daytime provided all breathing is through the nose.

Sprays, various applications in the nose, and inhalers are of limited service, since the causative agents are continuously present, and the local applications are used only at intervals.

* * *

Q Why does a person become sensitive to or allergic to something?

A One probable reason is overexposure or overindulgence—an overstepping of one's normal tolerance. After the condition of allergy has been established in a person, he or she may transmit a similar tendency to the offspring; in other words, inheritance may play a part.

Q How do you actually know what pollens are in the air at certain times?

A Glass plates covered with a sticky substance are exposed to the outdoor air. Upon these plates pollen grains fall, and they may then be identified by the microscope.

Q You mentioned the most generally employed method

od of treatment for hay fever namely to begin treatment fifteen weeks previous to the usual symptoms. What can be done for those who do not start treatment so early?

1 Inoculations may be started only a few weeks prior to the season and continued during the season. Treatment given only during the season of hay fever is the least satisfactory

Q I have a friend who with pollen treatment, is completely free from symptoms with the exception of a few minutes in the morning and a short time in the evening. Can you suggest any help for the morning and evening symptoms?

A The sudden change in the temperature to which the scantily clothed body is exposed, namely the change from a warm bed to the cool air on arising and from the heat of the day to the cool damp air after sunset, may be a cause. A sudden chilling of the exposed parts of the body causes a reaction in the nose especially and in the eyes sympathetically. Less exposure in the morning and more clothing in the evening are the answers.

Q I have heard of as many as one hundred and fifty tests being done on an allergic patient. Are as many as that necessary?

A No, and furthermore the great majority of that number are impractical. A careful history taken by the physician will exclude many useless tests and will often suggest probable causes. At the most, thirty to forty-five tests, all of which may be done at one visit, are sufficient. For seasonal hay fever, only a few tests are necessary.

Q Is it possible for all skin tests to be negative with a person who has hay fever throughout the year?

A Frequently repeated head colds, a chronic infection or inflammation of the nose or sinuses is often not distinguished from perennial hay fever by the laity although a proper diagnosis can be made by the physician. In such a case, skin tests are negative because the condition is not caused by ordinary proteins, but more probably by those of bacteria. When all other methods of treatment have failed a course of treatments with an appropriate vaccine is often of value.

Q You mentioned occupation as playing a part in the cause of hay fever. Will you cite a few cases?

A Bakers frequently become sensitive to the flour dust of the cereal grains also escaping gas from the ovens may irritate the nose. Housewives who do considerable baking may become sensitive to flour dust. Soap powders and house dust frequently irritate the nose. Those who work in factories where, of necessity there is much dust or lint in the air sometimes develop irritable membranes. The installation of air filtration blowers and exhaust fans have greatly eliminated the dust problem in factories.

Q Do roses really cause hay fever and what is a rose cold?

A From practical standpoint roses do not cause hay fever. It is possible for cut roses indoors to become so dried up that the pollen will get into the air and in unusual cases this results in an attack of hay fever that lasts for only a few hours. The fragrance of any highly scented flower may irritate the noses of some individuals but this is not true hay fever. Out of doors, other pollens to which a person is sensitive may be deposited by air currents on the rose flower. In such a case when a person smells the rose he is inhaling some other pollen that is the actual hay-fever cause, but the rose is naturally thought wrongly incriminated. Before it was established that grass pollen is the actual cause of hay fever at this

season roses were blamed and the condition was called rose cold.

Q You have said that brightly colored and very fragrant flowers as a rule do not cause hay fever. The assumption then that goldenrod lilacs, Easter lilies and so forth cause hay fever is erroneous?

A The pollen of goldenrod is too heavy and too sticky to blow about, the same is true of Easter lilies. If however these are kept indoors for a long time and allowed to become dry the pollen will drop off and may be blown about. The fragrance of lilacs, violets, carnations and so forth may irritate the nasal membranes temporarily but they do not cause real hay fever. The fragrance of apple and peach blossoms may irritate some noses. Practically no flowers used for cutting cause real hay fever.

DEATH

NOBLE—ANNGETTE F. NOBLE M.D., of Westfield died April 30. She was in her eightieth year.

Born at Westfield, she attended the schools there and received her degree from the Woman's Medical College of Baltimore in 1893. She was a fellow of the Massachusetts Medical Society and the American Medical Association and a member of the Women's Medical Association.

A daughter, a sister, a niece and a nephew survive her.

WEINGER—MORRIS A. WEINGER, M.D., of Lynn died January 27. He was in his forty-second year.

Born in New York City he attended Columbia University and received his degree from Boston University School of Medicine in 1927. He interned at Christ Hospital, Jersey City, New Jersey and Dayton National Military Hospital. He was assistant in cystoscopy and clinical assistant at the New York Post-Graduate Medical School and Hospital, New York City and was assistant urologist at Midtown and Harlem hospitals, New York City. He was on the staff of the Lynn Hospital at the time of his death.

Dr. Weinger was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow and two children survive him.

NEW HAMPSHIRE MEDICAL SOCIETY

DEATH

GILMAN—LOUIS L. GILMAN, M.D., of Rochester died at the Frisbie Memorial Hospital on April 12 after a short illness. He was born at Gilman Iron Works, September 1, 1863 the son of Andrew and Martha (Lodge) Gilman and was graduated from the Dartmouth Medical School in 1896. Dr. Gilman was an assistant surgeon in the United States Army from 1898 to 1901. He served in the Philippines as personal physician to General Fred Funston and also saw service at Puerto Rico. Long an enthusiastic horseman, Dr. Gilman had been recently re-elected president of the New Hampshire State Fair Association and had been appointed chairman of the Executive Board of the Medical Staff at the Frisbie Memorial Hospital which was organized about two months before his death when an offer of \$200,000 was accepted for a new hospital.

Dr. Gilman was a thirty-second-degree Mason and a past exalted ruler and life member of the Rochester Lodge of Elks.

He is survived by his widow, Elizabeth Gilman.

MISCELLANY

RED CROSS DRIVE

Orders for large quantities of surgical instruments, 10 field hospital units complete, 150 high-speed ambulances, each capable of carrying 4 stretcher cases, and 100 auxiliary hospital trucks have been placed by the American Red Cross, it is announced by Chairman Norman H. Davis. The supplies are to be given to Red Cross societies of belligerent European countries to assist them in caring for refugees and wounded.

Placement of these orders and others for essential supplies represented the first steps by the American Red Cross in expansion of war-relief activities. To finance this expansion the Red Cross, on May 10, announced a campaign to raise a war relief fund of a minimum of \$10,000,000. Prior to that date all relief activities had been financed from reserve funds of the organization and such contributions as were designated for that purpose.

In announcing the campaign to raise a minimum of \$10,000,000, Chairman Davis said: "Against great pressure we have delayed this appeal for funds hoping that we could, without it, finance the war relief expected of us. The great heart of America goes out to the victims of all wars. Our sympathies must not be empty expressions. We must send clothing, bedding, medications, surgical supplies. Relief must be sent as needed and not too late to be of use."

Up to the start of the campaign, the American Red Cross had spent approximately \$1,500,000 of its reserves and donations in helping sister societies in war affected nations care for the victims of hostilities. Chapters had spent an additional \$350,000 in the production of some 450,000 warm knitted and sewn garments and more than 2,000,000 surgical dressings. More than 250,000 women volunteers are at work producing relief supplies.

MAINE NEWS

RECENTLY REGISTERED PHYSICIANS

The following physicians were licensed to practice medicine in Maine on March 13, 1949:

THROUGH EXAMINATION

C. Davis Belcher, Portland
William Blaisdell, Bangor
John A. Caswell, Bangor
Clement L. Donahue, Portland
George F. Emerson, Farmington.
Donald C. Gates, Gray
Paul D. Giddings, Augusta
Maximilian Hirschler, Lewiston
John Merrick, Portland.
Rosario A. Page, Bridgeport, Connecticut.
Hans Schurman, Lewiston.
Reinhold G. E. Ulpts, White Plains, New York.
Preston J. Van Kolken, Holland, Michigan.

THROUGH RECIPROCITY

Paul V. Davis, Warrenton, Virginia.
Samson Fisher, Bristol.
John T. Guy, Portsmouth, New Hampshire.
Joseph G. Ham, Portland.
Hyman Hillstein, Mt. Desert.
Joseph P. Reath, St. David's, Pennsylvania.

NEW ASSOCIATION MEMBERS

The following physicians have been recently admitted to membership in the Maine Medical Association:

J. B. Marcotte, Lewiston
Bernard Gagnon, Patten
F. F. Larrabee, Washburn
Robert B. Somerville, Presque Isle.
Joseph E. Poerter, Portland
Alfred Oestrich, Mexico
Alfred W. Norris, Jonesport.
Leon Nemon, Portland.

ANNUAL MEETING OF THE MAINE MEDICAL ASSOCIATION

The program in brief for the eighty-eighth annual meeting of the Maine Medical Association to be held at the Rangeley Lakes House, Rangeley, on June 23, 24 and 25, is as follows:

SUNDAY, JUNE 23

4 30 p.m. First meeting of the House of Delegates.
8 30 p.m. Entertainment for the doctors and their wives.

MONDAY, JUNE 24

9 30 a.m. to 12 00 m. Group conferences
12 30 p.m. Luncheon (tables reserved for the alumni of various medical schools and members of the Tumor Clinics)
2 00 to 4 45 p.m. Clinicopathological conference and scientific session
5 00 p.m. Election of president elect.
5 30 p.m. Second meeting of the House of Delegates.
7 00 p.m. Dinner and dancing
9 00 p.m. Address by V. W. Peterson, special agent, Federal Bureau of Investigation, Boston.

TUESDAY, JUNE 25

9 30 a.m. to 12 00 m. Group conferences
12 30 p.m. Luncheon (tables reserved for past presidents and county secretaries)
2 00 to 5 00 p.m. Scientific session
7 00 p.m. Banquet (dress informal)
Introduction of visiting delegates and guests by President George L. Pratt, M.D.
Presentation of fifty year service medals.
Address Governor Lewis O. Barrows.
Address Morris Fishbein, M.D., editor of the *Journal of the American Medical Association*, "Quackery in Medicine."

NOTES

At the annual meeting of the American Surgical Association, recently held at Washington University, St. Louis, Dr. David Cheever, associate professor of surgery, Harvard Medical School, was elected president for the ensuing year.

Dr. J. H. Means, Jackson Professor of Clinical Medicine, Harvard Medical School, was elected vice president of the Association of American Physicians during the recent annual meeting at Atlantic City.

At the annual meeting of the Austen Riggs Foundation, Incorporated, held in Stockbridge, Massachusetts, on May 11, Dr. Horace K. Richardson was elected medical director, succeeding Dr. Austen F. Riggs, who died on March 5. Dr. Robert B. Hiden was elected senior assistant medical director, and Dr. Charles H. Kimberly, junior assistant medical director.

CORRESPONDENCE

APPROVED SCHOOLS FOR LABORATORY TECHNICIANS

To the Editor I have recently seen in the *Journal of the American Medical Association* (114 1269 1940) and in the *American Journal of Clinical Pathology* (10.261 1940) that an unauthorized individual in New Jersey is circulating the medical laboratory technicians of New England asking them to join an irresponsible body calling itself the American Medical Technologists.

As New England appears to be fertile ground for such unauthorized activities I suggest that those concerned in the matter refer to the article in the *Journal of the American Medical Association* which justly points out the dangers of the efforts of such an organization to destroy the educational and clinical standards that have been created by the American Medical Association and the American Society of Clinical Pathologists for the practice of this vocation.

SIDNEY C. DALRYMPLE M.D., Pathologist

Newton Hospital
Newton Lower Falls, Massachusetts.

TUBERCULIN TEST

To the Editor Will you kindly publish the following note in regard to change in instructions to accompany Old Tuberculin distributed by the Massachusetts Department of Public Health

In the revised instructions which will accompany the Old Tuberculin supplied by the Department of Public Health for tuberculin testing suggestion is made that the test should be read in seventy-two hours rather than in forty-eight hours, as previously recommended.

Many years experience with the tuberculin test has established two reasons for this practice first, to avoid reading a pseudoreaction due to redness alone second to make it possible to observe occasional delayed reactions.

The criterion for a positive test is an area of edema at least 5 mm. in the broadest diameter in addition to erythema or redness. Redness (from trauma or irritation) occurs early and disappears promptly usually in forty-eight hours. Edema on the other hand when present persists for many days. In a seventy-two-hour reading of the test the edema will still be present when the redness has entirely disappeared.

The seventy-two-hour reading is particularly desirable when the 1-mg dose is used to retest children who fail to react to the first injection of 0.1 mg. of Old Tuberculin.

PAUL J. JAKUBOWICZ M.D.,
Commissioner of Public Health

State House Boston.

MEDICAL OFFICER, NATIONAL GUARD

To the Editor There is a vacancy as first lieutenant in the Medical Department Detachment of the 110th Cavalry Massachusetts National Guard. Any graduate of a Grade A medical school below the age of thirty-five and in good physical condition may apply. Since this regiment leaves for its maneuvers in June, those who are interested should

make an early application. Further information may be obtained from my office.

DAVID B. STEARNS, M.D., Commanding Officer
Medical Department Detachment, 110th Cavalry

416 Marlboro Street,
Boston.

REPORTS OF MEETINGS

GREATER BOSTON MEDICAL SOCIETY

A regular meeting of the Greater Boston Medical Society was held at the Beth Israel Hospital on February 6 1940 with Dr. Max Ritvo presiding. The first paper was by Dr. Herbert I. Harris on "Group Psychotherapy." After a short résumé of the history of the movement from Déjerine in 1904 the speaker went on to the purposes and aims of group therapy at the Pratt Clinic. It has been found that psychoneurotics are inclined to be obstinate, especially in the hands of the general physician or of the specialist in a large clinic the one prerequisite of their successful treatment is the long time necessary for each patient, which these men are unable to afford. The group method of psychotherapy was conceived, therefore, as an effective filter that would adequately take care of the less severe cases and refer the refractive patients to a special psychiatrist.

The technique employed at the Pratt Clinic was described as childish in its appeal thus imitating the usual responses of such patients. Several classes are held each week and any new members are given front-row seats, where they command some attention. Older members are urged to make friends with these novices, and thus an increase in social intercourse is afforded both patients. Each person is assigned a definite number in order to inflate the ego, and all old members of the group hand in an anonymous record of their progress which is read aloud. These reports are placed in three piles according to their progress and the large preponderance showing great improvement was described as a great encouragement to doubtful new members.

Dr. Harris stated that one of the most important concepts employed is that these people are really suffering and that their pains are not just imaginary. The patients are urged to attain true muscular relaxation as an antidote for their existing tension.

The results of group psychotherapy at the Pratt Clinic during the past eighteen months were reported as promising. Of all the patients admitted to the medical clinics 26 per cent were referred to the psychiatric clinic. Of the new members of the group more than a third claimed improvement after the first treatment, while over a half showed eventual complete disappearance of symptoms. Sixty-eight per cent of all patients treated under the system were judged to have displayed marked to complete improvement. The best results are obtained in psychoneurotic patients, with some hope being held out for those who are psychotic and schizophrenic.

The next paper was presented by Dr. William M. Shedden on "Cancer of the Rectum." The speaker made a plea for early and accurate diagnosis of existing carcinoma and for adequate treatment of precancerous lesions when found. The need for extensive operation was considered to be the direct outgrowth of the late appearance at the clinic of 60 per cent of all such lesions. In the light of Duke's work, on the other hand, resection and colostomy were judged to be the safest procedure where palpation of the lymph nodes, even at operation may car

ry over a 60 per cent error Dr Shedden also favored Dukes's method of gradation based on the degree of penetration of the bowel and surrounding structures

Reasons cited for wrong diagnosis and delay of treatment included ignorance of anything more than "piles" among clinic patients, fear of lost time from work, and failure of the doctor to look for serious causes of symptoms in the presence of existing hemorrhoids, adenomas or fissures Dr Shedden suggested routine rectal examinations in all patients as a means of discovering asymptomatic lesions, and also the possibility of routine barium enemas if the cost could be sufficiently decreased It has been claimed by some surgeons that a properly performed digital examination will reveal any rectal lesion except those high in the sigmoid

The reasons for delay, which amounted to more than four months in 63 per cent of the patients studied, were varied Thirty-eight per cent had hemorrhoids, and 10 per cent had been treated for these prior to admission Almost two thirds of the people remained well nourished, and some were even obese Many had relief of constipation by mineral oil and a few had negative barium enemas The presence of a soft polyp was not inconsistent with malignancy and even metastases, while an improperly performed biopsy might well be returned as negative Dr Shedden concluded from these findings that the opportunities for increasing the number of cures of carcinoma of the rectum rest with the local physician rather than with the surgeon who finally performs the operation

Results at the Boston Dispensary revealed that these lesions were operable in 76 per cent of cases, and curable in 50 per cent, with a mortality of about 8 per cent

The next presentation was by Dr S J Thannhauser, who discussed 'Hyperlipemia' It was noted that although Spinoza recognized "milky blood," the phenomenon was not rediscovered until 1800 And although the finding is now usually considered in association with diabetes, Dr Thannhauser pointed out that newer partition methods indicate that some degree of hyperlipemia is far from a rarity The speaker stated, however, that the finding of various lipids in the circulating blood was merely a reflection of changes in the organs and not necessarily an indication of metabolism

The various causes of hyperlipemia were then briefly considered The alimentary type, which may result in a 100 per cent increase of the fat content six hours following a meal, was not considered abnormal or significant Dr Thannhauser stated that a true fat migration does occur clinically but that the route of the necessary nerve stimuli is not certain It seems to originate in starved tissue and the resulting hyperlipemia is consequently found in anemia, cachexia and so forth A third type is found in abnormal fat deposition, which may occur in hypothyroidism and idiopathic familial lipemia In the former case, all fats are increased, while the latter shows an elevation of only the neutral fats and an enlarged liver and spleen

A fourth form of hyperlipemia occurs in abnormal fat and carbohydrate metabolism, such as diabetes and von Gierke's disease Dr Thannhauser was of the opinion that the persistence of this condition after diabetes is controlled is due to chronic pancreatitis, which may then cause the leading symptoms The final cause of hyperlipemia cited by the speaker was a disturbance of the intracellular metabolism of the liver and spleen, such as is found in nephrosis, xanthomatosis and Gaucher's and Niemann-Pick's diseases An increase of the total lipids is found only in nephrosis and occasionally in Niemann-Pick's disease, whereas only lecithin and cholesterol are

elevated in xanthomatosis and there is a decrease of the total lipids in Gaucher's disease

The next speaker was Dr Samuel Proger whose subject was "Anorexia Nervosa or Hypopituitarism" Three such cases have been observed at the Boston Dispensary for periods varying from five to eight years They all showed certain of the characteristic signs and symptoms of anorexia, insomnia, loss of weight, amenorrhea, slow pulse, low blood pressure and low basal metabolic rate The return to normal was spontaneous in two cases, and coincident with the institution of insulin therapy in the third Hormonal and psychotherapy proved ineffective

Two patients returned after ostensible cure with unexplained edema of the lower extremities, while the third patient's course was complicated by generalized decalcification with spontaneous fractures

The problem brought up by Dr Proger was whether the condition was a neurosis or a functional hypopituitarism The effectiveness of psychotherapy in certain cases would be difficult to explain on the latter basis Furthermore, the whole syndrome is explainable on the basis of a voluntary anorexia following an emotional disturbance which soon becomes involuntary and leads to starvation, which can explain all the findings in this condition It was hypothesized that anorexia in such personalities may be analogous to excessive drink in certain other people as a release mechanism

The final paper of the evening by Dr Ethan Allan Brown was entitled "What We Can and Cannot Do in Allergy" The speaker chose to limit his remarks to common allergic conditions which he listed in the order of their showing skin tests as follows hay fever, asthma, eczema, urticaria and migraine Dr Brown stated that the lower incidence in the latter conditions merely means fewer cases are allergic, not that all such cases are less allergic Also, the presence of these latter diseases in known allergic patients usually indicates that there are multiple sensitivities

Hay fever was found to be 90 to 95 per cent allergic, and treatment produced the best results in that group Fifteen per cent received complete relief in the first year, and 30 per cent after two years, but the curve then leveled off rapidly Dr Brown, however, advocated perennial treatment of known allergic patients, for in that way more can be learned of secondary inciting factors and desensitization can thus be enhanced Only about 15 per cent of patients received no relief

In asthma patients true allergy was found to play a less important role while secondary factors, both physical and emotional, were indirectly proportional to the success of treatment Since therapy should be directed at the psyche as well as at the organic disease, Dr Brown stressed the importance of preventing rather than curing attacks, thus preventing anxiety The use of enteric-coated pills of epinephrine to ward off early morning episodes was described

In regard to eczema, the speaker reminded his audience that many of the symptoms were the result of secondary dermatitis and infection He suggested that intensive treatment of the local condition in those without proved allergy, which contains 40 per cent of this group, may result in permanent rather than temporary relief Such diligent therapy should be continued for four to six weeks after the skin is superficially well

Less than 20 per cent of patients suffering from urticaria were found to be allergic, and Dr Brown therefore urged the use of psychotherapy where emotional factors play a role The speaker emphasized that people are prone to blame the obvious rather than the possible true

cause of such eruptions. He has never found hives from strawberries and has never obtained a positive skin test in such alleged sensitivities. In the case of migraine, specific prophylaxis and desensitization are efficacious in the small percentage of cases exhibiting demonstrable allergy but the therapy of the others has been found unsatisfactory.

NEW ENGLAND PEDIATRIC SOCIETY

On February 7 the New England Pediatric Society held a symposium at Longwood Towers, Brookline on the treatment of meningitis. The first speaker was Dr. Josephine B. Neal of New York City who discussed "The Treatment of Epidemic and Streptococcal Meningitis." Dr. Neal mentioned that the results of all serum treatment have been confused in the past by the lack of an adequate means of standardization, particularly with the introduction of a new method. Further confusion of evaluation results from the variation in the type of the disease, which may be primarily septicemic or in the meninges, and also from the introduction of antitoxins which may have some antibacterial action.

In a large series of cases of meningitis the etiologic agents in the order of their incidence were meningococci, pneumococci and streptococci. The epidemic form was found most frequently during the first year of life.

In regard to therapy of meningococcal meningitis, Dr. Neal advised the combination of drug and serum treatment rather than the use of serum or drug alone. Serum should be given intraspinally where there is no septicemia, and should be continued until two successive cerebrospinal fluid cultures are negative. In case of clotting ventricular rather than cisternal puncture was considered the safer procedure. In patients with septicemia 25 to 50 cc. of serum intravenously twice a day was suggested but this route was advocated only as a supplement to intraspinal therapy.

Although most cases responded to drug therapy some strains have proved to be drug fast. Therefore, in drug treated cases, serum should be given if no response is noted within a short time. Sulfapyridine, although somewhat more irregular in its action has seemed more promising according to early studies than sulfanilamide. Dr. Neal reported a case fatality of 27.4 per cent for all her hospital cases, which often included very late ones.

In the treatment of streptococcal meningitis, chemotherapy has produced a drop in mortality to 28.3 per cent. Dr. Neal recommended the use of Neoprontol rather than sulfanilamide, for it can be used intramuscularly and is efficient in lower concentrations. Therapy should be continued for at least one week even when the course is favorable, and lumbar punctures should be carried out routinely for their therapeutic effect and in order to obtain cultures. The usual careful supportive regimen was suggested in addition to transfusions as indicated by regular blood studies.

Dr. LeRoy Fothergill spoke on "The Treatment of Influenza Meningitis." The increased incidence of this form of the disease, which has raised it to first place at the Children's Hospital, was emphasized by the speaker. It occurs most commonly between the ages of two months and two and a half years, when the circulating antibodies have been shown to be minimal. Prior to that time natural antibodies are present, whereas the infant's own immunity as a result of repeated slight exposure, does not reach adequate levels until the third year.

Haemophilus influenzae is a group consisting of many heterogeneous organisms, of which those causing meningitis are usually homogeneous. For the manufacture of ef-

fective antiserum it is necessary to employ virulent strains, and the isolation and crystallization of the specific polysaccharide gave hope of a more potent serum the speaker indicated.

The mechanism by which serum exerts its action in influenza meningitis differs from the usual form in that destruction results from lysis by antibody and specific complement rather than from phagocytosis. This has practical applications, for it was recommended that complement be of the human variety and that this ingredient always be injected intraspinally to compensate for the normal absence of complement in the cerebrospinal fluid.

Dr. Fothergill suggested the use of one or two intravenous injections of serum to counteract bacteremia, and the use of serum and specific complement intrathecally. He stated that drugs had been used in addition, but that so far no improvement had resulted. Reduction in mortality has progressed from almost 100 per cent before serum to 84 per cent with the original serum and to 75 per cent with the improved serum made from virulent bacteria. The speaker quoted 6 recoveries in 12 cases treated by Alexander, who has been using rabbit rather than horse serum.

An interesting "washing" experiment was cited by Dr. Fothergill as a possible explanation of the failure to lower the mortality more substantially. This indicated that *H. influenzae* may survive intracellularly and so resist destruction. The sugar content of the spinal fluid was suggested as a good prognostic sign.

The final paper of the evening was by Dr. Maxwell Finland who spoke on the "Treatment of Pneumococcal Meningitis." This agent is the commonest cause of meningitis in adults and is second in importance in children. Trauma was found an important predisposing factor at the Boston City Hospital, being surpassed in importance only by infections of the upper respiratory tract, paranasal sinuses and middle ears.

Dr. Finland pointed out that in this disease adequate phagocytes, besides specific antibodies and complement, are necessary for destruction of the bacteria. Sulfanilamide alone has been shown to inhibit growth of the pneumococcus, clear a low grade bacteremia and decrease, without eliminating, the meningeal infection. The addition of specific antiserum, however, sterilizes the blood stream and meninges. The speaker stated that when serum is used in conjunction with chemotherapy only a small amount of antibody and complement are necessary except where there is evidence of a local abscess or pneumococcal endocarditis.

Dr. Finland pointed out that the types of pneumococcus usually found are those of the nasopharyngeal flora, with Type 3 predominating. In this form of meningitis there are unusually large numbers of bacteria and tremendous amounts of specific soluble substance. On the other hand complement is only rarely present and will rapidly disappear if introduced. Furthermore, there are no "natural" cerebrospinal antibodies and those introduced intravenously do not reach this space.

Experiments cited by the speaker showed that despite an adequate concentration of sulfapyridine, pneumococci continue to increase for forty-eight hours. Then there is a subsequent killing off of bacteria even in the absence of demonstrable antibodies. This occurs only with susceptible strains, a fact which cannot be ascertained beforehand. It was concluded that the combination of chemotherapy and specific antiserum was the best method of treating pneumococcal meningitis.

The technic employed at the Boston City Hospital consists in the drainage and immediate culture of the cerebro-

spinal fluid Large doses of sulfapyridine are administered and intravenous serum injected Intrathecally, one should inject either the patient's own serum or specific pneumococcus antiserum and complement Sufficient fluids should be administered to ensure cerebrospinal fluid for drainage, and lumbar punctures should be performed frequently until normal The drug is continued for at least seven to ten days, and transfusions should be given whenever indicated.

Twenty-one per cent of all cases treated with chemotherapy at the Boston City Hospital in the past three and a half years have recovered Comparison of various combinations of therapy indicated that the use of drugs and serum is necessary in many cases of pneumococcal meningitis, and should therefore be used in all cases until more is known of the mechanism of action Combined therapy in a small group resulted in the survival of 47 per cent

In discussing the papers, Dr Kenneth D Blackfan suggested that more attention should be focused on the entire patient until additional advances are made in specific therapy He warned of the comparison of statistics gleaned from seasons when the virulence of the organism and the resistance of the host are variable The importance of early diagnosis was stressed, and its difficulty alluded to, particularly in children.

NOTICES

TRUDEAU SOCIETY OF BOSTON

A meeting of the Trudeau Society of Boston will be held at the Bristol County Tuberculosis Sanatorium, Attleboro, Massachusetts, on Tuesday, May 28, at 4 00 p.m.

PROGRAM

The Role of Atelectasis in Pulmonary Tuberculosis
Dr Felix Fleischner

Presentation of Cases

Cases illustrating problems in management. Dr
Garnett P Smith.

Follow-up cases of bilateral disease in an adolescent.
Dr P E Johnson.

Two cases illustrating extrapleural pneumothorax
Dr R. H. Betts

Cases illustrating lack of deformity following thoracoplasty Dr William R. Rumel

Discussion of case for differentiation diagnosis Dr
Richard H. Overholt.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|---------|-----------------------|
| Salem | June 3 | Harold C Bean |
| Haverhill | June 5 | William T Green |
| Lowell | June 7 | Albert H. Brewster |
| Gardner | June 11 | Mark H. Rogers |
| Pittsfield | June 17 | Francis A Slowick |
| Northampton | June 19 | Garry deN Hough, Jr |
| Brockton | June 20 | George W Van Gorder |
| Worcester | June 21 | John W O'Meara |
| Fall River | June 24 | Eugene A McCarthy |
| Hyannis | June 25 | Paul L. Norton |

NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The spring meeting of the New England Obstetrical and Gynecological Society will be held at the Mary Fletcher Hospital, Burlington, Vermont, on Wednesday, June 12. Registration and operative clinics will be held from 8 30 a.m. to 12 00 noon Luncheon will be served at the Burlington Country Club at 1 00 p.m., and a meeting of the executive committee will be held at 1 30 p.m.

A dry clinic at the Fleming Museum will take place at 2 00 p.m. There will be a symposium on pelvic trauma and relaxations The program will be as follows

Obstetrical Conservation of the Birth Canal Episiotomy, secondary repairs and so forth Dr H. A. Durfee

Restoration of the Birth Canal Anterior and posterior plastic operations and the Kennedy operation for urinary incontinence. Dr B F Clark.

Prevention and Treatment of Retroversion Dr E. D. McSweeney

Surgical Cure of Uterine Prolapse. Dr O N Eastman.

There will be a general meeting of the society and assembly at the Burlington Country Club at 5 00 p.m. Dinner will be served at 6 00 p.m.

JEFFERSON MEDICAL COLLEGE ALUMNI ASSOCIATION

During the meeting of the American Medical Association in New York City, the Jefferson Medical College Alumni Association will hold its reunion banquet on Wednesday evening, June 12, at 7 o'clock, at the Murray Hill Hotel, Park Avenue, at 41st Street. Tickets are \$2.50 each. Requests for reservations should be addressed to Dr Thomas F Duhigg at that hotel, but all alumni are urged to attend even though they have neglected to make reservations.

AMERICAN NEISSERIAN MEDICAL SOCIETY

The sixth annual session of the American Neisserian Medical Society will be held at the Shelton Hotel, New York City, on June 10 and 11 The program will consist of the presentation of papers on the biology of the gonococcus, vulvovaginitis and the prophylaxis, diagnosis, treatment and cure of gonococcal infection.

All who are interested are cordially invited to attend the meetings

PAN AMERICAN CONGRESS OF OPHTHALMOLOGY

Plans for a Pan American Congress of Ophthalmology to be held at the Hotel Cleveland, Cleveland, Ohio, October 11 and 12, have been announced

The congress will be sponsored by the American Academy of Ophthalmology and Otolaryngology, an organization of more than 2500 specialists in diseases of the eye, ear, nose and throat, which will hold its annual convention immediately preceding the Pan American gathering

The United States Department of State has expressed its interest, and the governments of all the countries of the Western Hemisphere have been invited to send official delegates It is believed that the meeting will do much toward bringing about an *entente cordiale* among scientific men of the two Americas, and it is expected that a permanent organization will be effected

Papers in Spanish or Portuguese will be made understandable to English speaking ophthalmologists by the use

of lantern slides projecting a synopsis of each paragraph translated into English. The reverse process will be used with the English papers. Spanish and Portuguese stenographers will be present to record the discussions in the language of the authors.

The congress is open to any ophthalmologist who wishes to register. Individual invitations have been sent to about 1800 members of the ophthalmologic profession in the Latin-American countries as well as to the national societies of eye specialists and the universities. Individual invitations have not been sent to ophthalmologists in the United States and Canada but official invitations to them are being printed in the various journals of ophthalmology. A fee of \$5 has been set for membership in the congress.

More detailed information may be obtained from Dr William P. Wherry 1500 Medical Arts Building Omaha Nebraska.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY MAY 26

TUESDAY MAY 28

- *9-10 a.m. Personality Factors in Internal Medicine. Dr C. Macle Campbell. Joseph H. Pratt Diagnostic Hospital.

WEDNESDAY MAY 29

- *9-10 a.m. Hospital case presentation. Dr S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

FRIDAY MAY 31

- *9-10 a.m. Changes in the Circulation Produced by Poor Postural Adaptation. Dr Eugene A. Stead, Jr. Joseph H. Pratt Diagnostic Hospital.

*Open to the medical profession.

- Ma 28—Trudeau Society of Boston. Page 898.
 June 4-6—National Gastroenterological Association. Page 737. Issue of April 25.
 June 4-7—American Association of Industrial Physicians and Surgeons. Page 634. Issue of April 11.
 June 7-8—American Heart Association. Page 669. Issue of March 14.
 June 7-10—American Board of Obstetrics and Gynecology. Page 658. Issue of April 4.
 June 8—Dedication of Oiler Memorial. Page 862. Issue of May 16.
 June 8 and 10—American Board of Ophthalmology. Page 719. Issue of November 2.
 June 8-10—American College of Chest Physicians. Page 781. Issue of May 2.
 June 10—American Medical Golfing Association. Page 824. Issue of May 9.
 June 10, 11—American Neisserian Medical Society. Page 898.
 June 10-14—American Medical Association. Annual meeting. New York City.
 June 10-14—American Physician Art Association. Page 332. Issue of February 22.
 June 12—Harvard Medical Alumni Association. Page 781. Issue of May 2.
 June 12—New England Obstetrical and Gynecological Society. Page 898.
 June 12—Jefferson Medical College Alumni Association. Page 898.
 June 23-25—Maine Medical Association. Annual meeting. Bangor, Maine.
 June 25-27—Medical Library Association. Page 862. Issue of May 16.
 June 27—Penwicket Association of Physicians. The Try-Angle. Groveland.
 September 2-6—America Congress of Physical Therapy. Page 862. Issue of May 16.
 October 8-11—American Public Health Association. Page 653. Issue of April 11.
 October 11-12—Pan-American Congress of Ophthalmology. Page 898.
 October 21—American Board of Internal Medicine Inc. Page 369. Issue of February 29.

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

JULY 31.
 OCTOBER 30.

BOOK REVIEWS

Blood Groups and Blood Transfusion Alexander S. Wiener. Second edition. 306 pp. Springfield, Illinois, and Baltimore Charles C Thomas 1939 \$5.00.

The second edition of this well known work has clarified a number of subjects which were formerly not clearly understood therefore a good deal of new material has been added to every chapter and some of the old material has been deleted. The application of blood grouping to medicolegal work has been treated in more detail and the section on the grouping of blood stains has been completely rewritten and expanded.

In the chapter on the technique of blood transfusions there are several points in regard to the citrate method which require correction. The author apparently approves the straining of citrated blood through gauze before injection into the patient. In the reviewer's experience, however this has often led to clotting of the blood because of the presence of calcium salts in the bleached gauze. This is an obvious chemical reaction since calcium precipitates soluble citrates.

In ascribing to Marriott and Kekwick a citrate apparatus which is completely enclosed, the author apparently is not aware that this method was used by the United States Army Medical Corps during the World War. Furthermore, in regard to continuous drip transfusions, it should be mentioned that Marriott and Kekwick did not describe this technique until seven years after it had been in common use in certain hospitals in the United States. Fortunately the author points to the dangers inherent in the use of preserved and "bank" blood—a warning particularly timely with the increased and sometimes uncritical enthusiasm for this technique.

As usual the publisher and printer have done an excellent job. It is a volume which should be on the shelf of every physician.

In Memoria del Prof. Fabio Rivalta. Società Medico-Chirurgica di Romagna. 398 pp. Faenza Italy Fratelli Lega 1939.

On September 18 1938 at Cesena Italy the Società Medico-Chirurgica di Romagna held a meeting of commemoration for Prof. Fabio Rivalta, who had died on September 2. In connection with this meeting, the society has published a memorial volume, to which thirty three of his students and friends have contributed articles covering all the fields of medicine. The volume also contains a good portrait, a short biography and a bibliography of his writings.

Prof Rivalta was best known for the discovery of the so-called "Rivalta reaction" for the differentiation of transudates and inflammatory exudates, which he first described in 1910. In the memorial volume this subject is discussed in three articles by Drs. Chiodini and Gironi.

Health for New York City's Millions. An account of activities of the Department of Health of the City of New York for 1938 with comparative vital statistics tables Edited by Savel Zimand. 295 pp. New York Department of Health, 1939.

Dr. Rees's informative and substantial record of the activities of the Department of Health of New York City for the year 1938 is an effective answer to the criticism that records of health department activities are of necessity as dry as dust. With no sacrifice of accuracy this volume presents all the information essential to a health-

department report in an exceptionally readable form. In part the success in presentation of the material is due to the use of brief statements of the underlying plan or policy at the beginnings of chapters which lead the interest up to the facts themselves. The judicious use of photographs adds materially to the attractiveness of the book for the lay reader.

To the health officer this is an impressive record of well balanced municipal health administration. An outstanding feature of the New York City program is the development of neighborhood health centers throughout the city. This is the most effective method yet tried for bringing health services to the people in urban communities and is indispensable in a city the size of New York. The epidemiologist may feel somewhat confused to find case rates and death rates for whooping cough based on the estimated population under five years of age, the rates for measles on the population under fifteen, and the rates for poliomyelitis on the total population. The emphasis on age susceptibility is important, but comparison becomes difficult.

To the physician such a report is a reminder of how far public health can supplement medical treatment without invading the field of practice. More than that, in such activities as the consultation chest services for physicians and the pneumococcus-typing stations, the health department is making available to the general practitioner services which he cannot readily provide for himself.

The Story of Surgery Harvey Graham 425 pp. New York: Doubleday, Doran & Co., Inc., 1939. \$3.75

The author of this book has assumed the pen name of Harvey Graham, and is said to be a distinguished British physician, his identity is unknown to the reviewer. His *Story of Surgery* is in many ways a remarkable and unique book. Avowedly a "story book," it is in fact a readable running narrative of the evolution of the science and art of surgery from prehistoric times to the present, told with humor and essential historical accuracy but with occasional excursions of the imagination, which fill in the factual lean spots, to the great satisfaction of anyone but a scholar. The author defines his purpose by saying that it is not a history book or historical treatise, and that it should be read by "an ordinary man or woman—as distinct from that nebulous and rather awe inspiring creature the intelligent layman." There are no bibliographic notes, but an appended list of sixty-odd books and monographs, comprising the chief source material, and indices of names and subjects. There are twenty-three admirably executed plates, among which New England readers will be glad to see the familiar painting of the first operation under ether, at the Massachusetts General Hospital.

The stories of the greatest figures in surgery—Paré, Harvey, Hunter, Lister—are admirably told. It is perhaps in the account of contemporaneous surgery and in prognostication of the future that the author is least happy. Few will agree that "Russia is untrammelled and ahead in all the sciences of medical research" or that "diabetic gangrene is now a surgical rarity," or that the female relatives of a woman with cancer of the breast are several times more likely to develop the disease than are other women and therefore that any lump should be treated by complete mastectomy. The part played by American surgeons in modern surgical progress is by no means adequately portrayed, an example of which is the attribution to "Dr. McBurney of Roxbury" of the chief part in the evolution of the surgical treatment of appendicitis in America. Halsted's contribution was rub-

ber gloves, and Cushing is not mentioned in connection with brain tumor.

The *Story of Surgery* may be confidently recommended as entertaining and instructive reading for doctors and for such laymen as have more than a casual interest in the subject.

Tumors of the Skin Benign and malignant Joseph J. Eller 607 pp. Philadelphia: Lea & Febiger, 1939. \$10.00

This book will be valuable to medical students, physicians and dermatologists because the subject—tumors of the skin—is comprehensively discussed in one small volume. The appearance of benign and malignant new growths is adequately described, as well as the etiology, prognosis and treatment, and a clear picture is presented in a readable manner. The chapters on carcinomas of the skin with the differentiation of the basal-cell and squamous-cell types might arouse controversy among some pathologists, but it corresponds with the opinions of many dermatologists. The diagrammatic examples of these lesions in special locations, with suggested methods of therapy in their prevention, contain many valuable and practical ideas. Radium plaques properly constructed as to size and strength have been found of more value in the treatment of various cutaneous lesions than are radium tubes, and, in the opinion of the reviewer, are more practical in the treatment of superficial tumors where superficial radiation is indicated. It is interesting and refreshing to read a book written by a dermatologist who has the courage to outline an intelligent and workable technic for cutaneous surgery, which, with proper instruction, could be and should be mastered by young men entering dermatology. The principles and technic of roentgen and radium theory are clearly expressed. There is an excellent appendix containing practically all the data on radiation, physics and biology, including dosage tables and charts.

The Vitamins A symposium arranged under the auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association 637 pp. Chicago: American Medical Association, 1939. \$1.50

The achievements in the science of nutrition in recent years have been numerous as well as most significant in the realm of modern medicine. The original vitamin alphabet has been greatly extended, and some of them have been subdivided. Research in vitamins tends largely toward their isolation and synthesis. New factors have been discovered which concern the growth of animals, their prothrombin content, abortion in cattle, effects on the endocrines and a variety of physiological effects. In view of the galaxy of diverse work on vitamins, new discoveries and rapid progress, this symposium is more than welcome.

Each chapter is written by distinguished investigators in their respective fields. Clearly written and understandable, without confusing excursions in intricate details, it is recommended to all. It should be a relief to those who up to now have depended on the somewhat exaggerated interpretations expressed in the pamphlets issued by pharmaceutical houses. In the introduction Dr. Morris Fishbein warns "the public and the medical profession against the commercial exploitation of individual vitamin preparations and particularly against the promotion of mixtures of vitamins as panaceas." This volume clearly presents the clinical and laboratory aspects of vitamins and deserves unrestricted praise.

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IMMUNITY TO VIRUS DISEASES*

Some Theoretical and Practical Considerations

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NASHVILLE, TENNESSEE

ONE of the great difficulties encountered in the study of immunity from an experimental standpoint is the fact that, so far as medicine is concerned, there are few infectious diseases of man that can be induced in experimental animals with sufficient exactitude and constancy amidst conditions simulating those under which they make their appearance naturally, to enable the investigator to translate his experimental data in terms of spontaneously occurring disease. This difficulty has tended to divert the attention of investigators away from studies of pathogenesis—that is, the mechanism of infection, without a knowledge of which specific immunity cannot be fully understood. Possibly it has been easier in the laboratory to follow and to measure the antibody response of an animal to the parenteral injection of various antigens than it has been to observe and to trace the progress and mechanism of spontaneous or induced infection. To understand the mechanisms of defense one should be able to watch the varying tide of battle between the active agent and the host, and to appreciate more intimately the tactics of the latter as it succeeds in gaining and maintaining the upper hand.

This perhaps can be more readily accomplished, at least to a certain extent, with viruses, because each of these agents affects a certain type or types of cells in a very specific way and often leaves cytologic traces of its progress.

Among the great basic facts of immunity are three that merit consideration: first, that there are relatively few types of microbial parasites that under ordinary conditions of life are capable of inducing infective disease, and each as a rule only in a limited number of varieties of hosts, the others

being naturally immune, secondly, that the host is usually capable of offering active opposition to the advance and destructive influences of an established infection, and, finally, that after recovery the host is often as a result of the experience of infection, much more resistant than before to a second infection by the same agent—that is, it acquires immunity. Except that every virus that is known is a pathogenic agent, the above facts are likewise the foundation of knowledge of immunity to viruses.

During the course of and following many infective diseases, changes take place in the circulating plasma of the host that are expressed by specific phenomena which make their appearance when the infectious agent or some of its products, or both, are brought into contact with the serum under appropriate conditions. These phenomena are agglutination, precipitation, lysis, complement fixation, toxin neutralization, opsonization and, in the case of serum from hosts that have overcome many kinds of virus infections, a specific inactivating effect on the corresponding virus when mixed with it under suitable in vitro conditions.

The potential importance to acquired immunity of antibodies that circulate in the body fluids is especially evident in the case of infections caused by micro-organisms that grow in and spread by way of the body fluids or produce injurious soluble antigenic products similarly distributed to the body tissues as a whole. The protective and curative effect, for example, of circulating antitoxin that combines with and neutralizes diphtheria toxin in vivo is apparent, and the beneficial influence on the course of pneumococcal pneumonia of type specific antipneumococcus serum is explainable by virtue of the demonstration of the destructive effect of such a serum on the protective capsular polysaccharide that confers the antigenic specificity on each type and determines the production of an

*The Shattuck Lecture, delivered at the annual meeting of the Massachusetts Medical Society, Boston, May 21, 1940.
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antibody peculiar to itself. Dissolution of the capsular material renders the pneumococcus a prey to phagocytosis by leukocytes in whose cytoplasm the denuded diplococci disintegrate.

But the toxin of the diphtheria bacillus and the capsule of the pneumococcus are surrounded by the body fluids because of the natural extracellular position of these antigens in the mechanism of their respective infections, and they are presumably immediately affected by their respective circulating antibody.

Matters become somewhat more complicated when we consider recovery from and active resistance to certain other infections, for example typhoid fever. In the blood serum of typhoid-immune animals and human beings there are bacteriolytic, bactericidal and agglutinating substances and, to a lesser extent, precipitating and opsonic bodies, but no true antitoxins.

Notwithstanding the rather detailed knowledge of antigenic constituents of the typhoid bacillus and of the numerous antibacterial effects elicitable from immune serum, it is admitted that from a theoretical standpoint the importance of specific antibodies in recovery and resistance is uncertain because the bacteria frequently disappear from the blood long before the patient is cured.

Furthermore, although one attack of typhoid fever protects against subsequent infection, circulating antibodies disappear from the blood of typhoid convalescents usually within the first seven months after recovery. The more durable immunity, therefore, cannot well be attributed to them, but rather to a greatly enhanced capability of response to small amounts of antigen on the part of the cells that have become accustomed, as a result of infection, to producing them rapidly and effectively.

Infection of man with the typhoid bacillus seems to entail a very complicated series of events, and until the background of pathogenesis of the disease is better understood one will probably not know just what protective mechanisms are involved and in what ways. The whole course of events in typhoid fever, a disease not yet reproduced in lower animals, is not explainable on the assumption of an extracellular parasite liberating antigens that are responded to by antibodies capable of acting directly on the exposed bacilli to destroy them immediately or to promote their destruction by cells. Dr J W Adams and I^{1, 2} have recently presented evidence that the typhoid bacillus in human infections may be at times in the course of the disease an intracellular parasite, nourished and supported in growth by the cytoplasm of plasma cells in intestinal and mesenteric lymphoid

tissue. It would seem that so long as this intracellular reproductive phase of the infecting bacilli can be maintained, circulating antibodies should have little effect on them, and cessation of symptoms might ensue only after an undetermined break in this chain had taken place.

Intracellular infections by bacteria, protozoa and rickettsia introduce especial problems of their own, and they are possibly more closely related, as regards pathogenesis and immunity, to virus diseases than they are to extracellular infection, because the cell-parasite factor must be reckoned with in both instances.

The activity of viruses is as yet recognizable only by the changes induced in infected hosts, and all pertinent evidence indicates that these agents of disease require the internal medium of living cells for multiplication, whether they be inanimate molecules or obligate parasites. The hypothesis of cytotropism of viruses that formulates this doctrine is of great help in attempts to clarify and to render comprehensible the processes of pathogenesis, and to correlate them tentatively with the mechanisms of immunity.

Something of the cell-virus relation can be especially well demonstrated in fowlpox, a disease of birds that simulates variola in many ways, and its lesions may be correlated with the general pox group which includes not only smallpox, but alastrim, vaccinia and molluscum contagiosum. Fowlpox is an especially good example to illustrate the point at issue, because it is as yet the only virus disease in which the active agent has been proved experimentally to be inside infected cells and to be a constituent of a specific cellular inclusion such as one frequently finds in virus lesions. This experimental demonstration was made several years ago in collaboration with Dr C E Woodruff.³

The wart-like lesions of fowlpox occur particularly in the skin, usually as a result of secondary localization of virus carried by the blood stream from a primary focus, probably most commonly situated in the mouth. The lesion is characterized mainly by hyperplasia and swelling of epithelial cells, each of which contains a relatively large intracytoplasmic mass known as the Bollinger body.

Dr Woodruff and I found that trypsin in weakly alkaline solution rapidly freed the specific cellular inclusions of fowlpox from infected epithelial cells by dissolving the epithelial membrane and cytoplasm, so that the refractive inclusions, which are relatively quite large and substantial, could be obtained in quantity. By picking out individual inclusions with a micropipette and washing them in 2 per cent sodium chloride solution, until the washings no longer contained de-

monstrable active virus, we showed that a single washed inclusion inoculated into a feather follicle of a hen caused fowlpox infection at that site. Each well formed inclusion contains many thousand minute particles, uniform in size, coccoid in shape, measuring 0.25 micron in diameter and possessing definite staining reactions. These are incorporated in the inclusions by a lipoproteid matrix, and they are known as the specific elementary bodies of this disease. By means of an attenuated glass point and microdissector, we were able to break up a single inclusion and to inoculate several feather follicles of a hen with minute fragments containing elementary bodies, the result was multiple infections with material from one inclusion.

This evidence indicates very strongly that the elementary bodies of the fowlpox intracellular inclusion are associated with the specific virus of this disease, and that they become agglomerated, together with a lipoproteid matrix, within the cell into a cytoplasmic mass, the Bollinger body. It has also been demonstrated that the elementary bodies of vaccinia and of molluscum contagiosum are intracellular and are the most important constituents of the respective cellular inclusions.^{4, 6}

Further evidence that the elementary body of this and certain other virus diseases represents the virus particle itself is furnished by the facts that washed elementary bodies are infectious and that they are specifically agglutinable by immune serum.⁴

The peculiarity of virus infections as contrasted with most bacterial infections is this apparently necessary cell virus relation that not only determines the characteristic picture of a particular disease but underlies the portal of entry and spread of virus, as well as its multiplication in the invaded host. It is that relation also which by determining the pattern of pathogenesis in any particular virus disease lends an especial fascination to its study. The intracellular position of the infectious agent furthermore, may protect it from circulating antibody, and in other ways influence the mechanism of immunity.

A thorough understanding of the pathogenesis of particular virus diseases would involve a knowledge of such elements as portals of entry, primary infection dissemination, secondary localization and elimination, and, if the hypothesis of cytotropism is to be of help, all these phenomena in the infectious process must be exactly related to the particular type or types of cell primarily invaded and those secondarily infected in each case, for complete immunity might be due in some cases to an acquired specific resistance limited to the type of cell

at the portal of entry alone, other cells, such as those of the central nervous system, remaining susceptible. The cell virus relation probably varies with every virus, and these variations may be spectacular, conferring complicated patterns of disease on the infected host. A few illustrations will, I hope, suffice to illustrate the principle involved.

There are certain viruses of human disease that seem to multiply within and to affect only the epithelial cells of the skin, for example those of warts and of molluscum contagiosum. The infectious agent is brought into direct contact with exposed susceptible epithelium from without, although in the case of warts, injury may result in secondary foci by lymphatic spread. Metastases do not seem to occur as a result of blood-borne virus. In the first example of infection it is quite likely that cutaneous injury exposes epithelium to contact with virus from the outside. These viruses are referred to as epitheliotropic, and are presumably obligately so. Because the lesions are confined to the skin and shed their component infected cells to the exterior, it is possible that relatively little antigenic material gains entrance into the body, and these diseases tend to run a rather long course.

There are other virus diseases of man that are characterized clinically by a cutaneous eruption, and in the skin lesions, epithelial cells are likewise prominently involved. Examples of such diseases are smallpox, chickenpox and possibly measles. In the lesions of these diseases, certainly in those of variola and varicella, virus affects not only epithelial cells but also those of mesodermal origin, such as fibroblasts and endothelium. This is of importance with reference to spread and secondary localization of these infections, which evidently take place by way of the blood stream. A primary lesion occurs no doubt somewhere in the upper respiratory tract, thence virus liberated from infected cells gains entrance into the blood stream to relocate in the skin and internal organs, where there are accessible susceptible cells, to form secondary foci.

In a third group of virus diseases of man the nervous system is especially involved. Of this group the viruses of poliomyelitis and rabies seemingly are obligately neurotropic; that is, they appear to require the medium of neurones for their multiplication and spread.

The conception of cytotropism is of fundamental significance to an interpretation of the pathogenesis of such various types of infection, for, if it be true, then the portal of entry of each obligate neurotropic virus must be through neural channels. In the monkey, at least, this appears to be

the case with the virus of poliomyelitis, because following intranasal instillation the pathway of infection seems to be along the exposed filaments of the olfactory mucosa, thence by way of axones and dendrites to the olfactory bulb, thence to the brain and spinal cord. Similarly the bite of a rabid dog introduces rabies virus from the saliva into injured tissue containing exposed nerve processes, and it appears that it is through these endings and axones that the virus reaches the central nervous system, to disseminate there likewise through neural channels. Experimental evidence for neuronal spread has been obtained especially from studies of herpetic infection in rabbits.⁷

Other viruses that affect the nervous system are not so restricted in their requirements, but affect more than one type of cell. Among these are the viruses of St. Louis encephalitis, equine encephalomyelitis and yellow fever, in lower animals a good example of this group is the virus of canine distemper. Such viruses as these probably enter the brain to infect neurones or supporting tissue only by way of the blood stream, and the portal of entry might be a cutaneous injury, such as the bite of a mosquito, that exposes capillary endothelium and blood to the virus.

The viruses that affect more than one type of cell, such as those last named, have been referred to as polycytotropic viruses, and I regard this term as more appropriate than pantropic or viscerotropic, although the latter are often employed. The use of the term polycytotropic, however, does not obviate the necessity of demonstrating each kind of susceptible cell in every case, because from the standpoint of understanding these infections, their pathogenesis and eventually the mechanism of immunity to them, it is of great importance to know just what specific types of cell are affected and how cytotropism determines pathogenesis. DeMonbreun's⁸ studies of canine distemper show that not only epithelial cells but also vascular endothelium is susceptible to this virus. Infection of vascular endothelium is no doubt concerned with spread of the virus, and localization of the infection in the brain is probably not through neurones but by way of the vascular endothelium as the portal of entry from the blood stream. It is possible also that a similar mechanism exists in St. Louis encephalitis and equine encephalomyelitis. In yellow fever it might also be that endothelium is first infected, and that virus thence liberated into the blood stream localizes secondarily in the cells of the liver.

No virus has yet been cultivated in the absence of living susceptible cells, and because of this fact it is a difficult matter to obtain viruses in a state of purity and in quantity necessary for extensive

analyses. Their nature remains undetermined, but they appear to lie somewhere along the borderland of the living and the inanimate, possibly constituting a liaison between them. They are particles of different size, they contain nucleoprotein, and they are antigenic. Frequently recovery from infection is followed by specific resistance to reinfection that lasts for varying periods, from weeks to many years, and occasionally perhaps throughout life, depending largely on the type of virus. The striking immunity so often observed makes the virus infections especially interesting from the standpoint of acquired resistance, and has led to the practices of prophylactic immunization by passive transfer of specific serum or vaccination with modified active virus and even with non-infective preparations, which in some cases have proved to be effective.

As in bacterial infections, specific antibodies also appear in the serum of animals that have recovered from virus diseases or have been actively immunized by vaccination. The virus antibodies simulate in general those demonstrable as a result of infection or vaccination with bacteria, but it is to be especially emphasized that virus infection elicits the production of specific antibodies that, under proper conditions *in vitro*, have a neutralizing effect on the virus concerned, and that this reaction simulates the toxin-antitoxin reaction. In regard to immunity it is possible that the effect of this antiviral antibody at least in some cases is in relation to the cell-virus complex, as it might operate to prevent virus from entering susceptible cells.

But one must be cautious in such interpretations, and I wish to emphasize that the phenomena of active resistance to recurrence of a specific virus infection are not necessarily coexistent with the presence of these demonstrable changes in the serum. The occurrence of specific antibodies in the blood serum of recovered hosts does not always signify immunity, nor is there as yet a well-established relation of specific antibodies to the state of heightened resistance or immunity that follows natural virus infection. It has been shown, for example, in the case of vaccinia virus that a rabbit vaccinated with inactive elementary bodies to the extent that its blood serum contains abundant agglutinating, precipitating and complement-fixing antibodies is just as susceptible to infection with active vaccinia virus as is a normal rabbit.⁹ It would seem more likely that the antibody that neutralizes a virus *in vitro* is related in some way more directly to the mechanism of immunity than are those responsible for agglutination and precipitation, yet such experiments as those of Hodes and Webster¹⁰ with the virus of the St. Louis type of encephalitis

make it appear very doubtful that, in this infection at least, there is any such relation. These investigators showed that mice vaccinated with the St. Louis encephalitis virus become highly immune and continue so for six weeks after vaccination, at which time few or no neutralizing antibodies are demonstrable in their serums. Then immunity begins to wane, and as it lessens, neutralizing antibodies make their appearance and rapidly increase in amount, to reach their height twenty-two to twenty-four weeks after vaccination, at a time when the animals have ceased to be resistant to reinfection.

No toxins have been demonstrated in virus lesions, and consequently no evidence of antitoxins in immune serums has been found. Little is known about phagocytosis of viruses as a combative mechanism, or about the participation of complement in any destructive capacity.

It is obvious, therefore, that the mechanisms involved in immunity to virus infections are not at present clearly understood, and they are unlikely to be until a better comprehension of their relation to pathogenesis of these infections has been attained.

Notwithstanding the inability to explain the mechanism of immunity on the basis of known specific humoral antibodies, the rather anomalous situation exists that, in the case of at least a few viruses, infection can be prevented by a properly timed and measured dose of specific antiserum. This is an established prophylactic practice for the prevention of measles—presumably a virus disease. A similar practice seems to be of preventive effect against mumps, and experimentally it is effective to some extent against others, including vaccinia. These are empirical facts, however, and they do not elucidate the mechanism of heightened resistance. The explanation will no doubt eventually be found in additional knowledge concerning pathogenesis, which is determined by the cell virus relation.

Some students of virus diseases think that the formerly susceptible cells of a recovered host acquire a specific resistance as a result of virus infection, and that such a change is of equal or even greater importance in some cases than is the acquisition of humoral antibodies. But the assumption of acquired cellular immunity separate and apart from humoral antibodies has not been well substantiated by direct experiment.

I should like in this connection to refer briefly to some studies we¹¹ have made with the virus of fowlpox previously mentioned. These experiments were undertaken to determine whether or not we could find evidence of an increased cellular

resistance to infection in fowls with acquired immunity. This disease offered, we thought, an exceptionally favorable opportunity for experimental study of certain phases of this problem because the virus affects especially cutaneous epithelium, manifesting itself by easily recognizable specific cellular inclusions, and because the skin can readily be grafted onto the chorioallantois of chick embryos from both normal and immune fowls. The latter fact affords a favorable method for studying the behavior of cutaneous epithelium under different environmental circumstances.

Our first objective was to determine whether or not established skin grafts from normal and immune fowls were susceptible to infection with the virus of fowlpox, as manifested by the development of the pathognomonic Bollinger bodies within the cytoplasm of the epithelial cells following inoculation.

These experiments conclusively proved that the epithelial cells of skin from chickens with an acquired immunity to fowlpox and completely resistant to infection by cutaneous inoculation, while a part of the immunized host, become quite as susceptible to infection by this virus as do grafts of normal skin after grafting onto the chorioallantoic membrane. If such grafts, as well as those from normal chickens, were regrafted onto muscle of immune chickens and inoculated, no infection took place. Normal skin, on the other hand, if regrafted onto the muscle of normal chickens, was quite susceptible to infection by inoculation. We found no indication, therefore, of the existence of an acquired immunity inherent in the epithelial cells themselves, but our results pointed rather to humoral or local factors in other tissues as the cause of acquired resistance of the normally susceptible epithelium.

Under some circumstances acquired insusceptibility of certain cells of a host seems out of proportion to the concentration of demonstrable circulating antibody, and this is the case with epithelium of chickens immunized to fowlpox. One is tempted to conjecture that humoral antibody might be concentrated in the skin, perhaps inside the epithelial cells themselves, from the surrounding medium. When grafted onto the chorioallantois such antibodies would become diluted by the plasmatic circulation in the graft and thereby be rendered ineffective. There is little experimental basis for such an assumption, although the reported success of McKinley¹² and of Hallauer¹³ in conferring passive immunity to rabbits against intracerebral injection of herpes virus by repeated doses of immune serum, while no cerebral immunity could be demonstrated after a single large

dose, might be interpreted to mean that after a period of time circulating antibody kept at a high level by repeated administration might finally penetrate the cerebrospinal fluid or the nerve cells themselves, temporarily heightening their resistance

So far as our own investigations have enlightened us, immunity to those virus infections with which we have worked, especially fowlpox and herpes simplex, appears to be importantly contributed to by something of a specific nature circulating in the blood. What this something is and how it works to prevent or ameliorate infection we do not know. We should suppose it to be a specific antibody, but whether it is one of those demonstrable by *in vitro* tests or another as yet unrecognized is obscure. This hypothetical antibody to fowlpox does not necessarily operate in such a way as to prevent virus from entering susceptible cells and inducing typical lesions, as was shown by the following recent experiment

After a certain dose of hyperimmune hen's serum was injected intravenously into baby chicks, the down of whose heads had been plucked, and this was followed by an intravenous dose of fowlpox elementary-body suspension, just as many lesions developed in the injured skin, eyelids, mouth and stomach as appeared in controls treated the same way except that they received normal hen's serum. However, the controls rapidly became sick and died several days earlier than did those passively immunized. Some of the latter recovered after the lesions, which continued to increase in size for a while, aborted and healed prematurely. These experiments are not yet complete, but it seems at present that the immune serum might act, among other ways, to protect the chick against some injurious agent elaborated as a result of infection rather than to prevent the infection itself, although it certainly exerts an inhibiting effect on the full development of established lesions.

One is hardly in a position at present to exclude some active participation at times of the susceptible cells themselves in the immunity process, because actual infection of a given type of cell, for example the cerebral neurones of a rabbit with herpetic encephalitis, confers after recovery a strong immunity to subsequent intracerebral injection of herpetic virus that seems to be independent of circulating antibody, while keratitis alone, although it confers immunity to subsequent corneal inoculation and stimulates the formation of antibody, often does not protect the brain from infection by intracerebral inoculation.

It is possible that it is necessary for active virus to enter susceptible cells in order that they may

respond in some way to heighten their resistance, for example by the local formation of antibody. If this should be true it might explain the frequent failure to induce effective resistance by the injection of inactive vaccines. Active virus evidently has the capacity to enter susceptible cells, but if the virus becomes altered in such a way that it does not induce infection, that alteration might also be of such a nature as to destroy its capacity to gain entrance into cells ordinarily susceptible, and thus to elicit a protective response to it. But on this hypothesis one must assume that virus enters all susceptible cells, and there is no evidence of this at present. On the other hand, circulating antibodies might enter and to a certain extent become concentrated in the course of time in cells that do not produce them. Passive immunization of the brain of rabbits against an intracerebral injection of herpes virus by repeated injections of immune serum might be explained in this way, for a single large dose of immune serum is not protective.

There is one group of virus diseases that should be especially susceptible of modification or prevention by parenteral injection of immune serum, that is the group in which the virus is spread in early stages of the disease by the blood stream, particularly if endothelium is infected. In this group one might tentatively include yellow fever, variola, varicella and measles. One can reasonably assume an initial lesion from which virus is thrown into the blood stream, or an initial infection of vascular endothelium itself such as can be induced experimentally in canine distemper and in experimental herpetic infection of the chick embryo, which will be described later. If circulating antibody be present during the development of the primary lesion, blood dissemination and metastasis may be prevented or modified provided virus is exposed to antibody in the circulating fluid. In all likelihood this is the way in which an early administered dose of measles immune serum exerts its protective effect.

In another group of virus diseases, including especially those in which the virus seems to be obligately related to nerve cells, such as poliomyelitis and rabies, there would seem to be much less likelihood of favorably influencing the course of the infection by the introduction of immune serum, because virus can gain access to and spread through the nervous system by means of neural processes apparently without becoming subject to the influence of circulating inhibiting factors. Indeed, the use of immune serum in these diseases has been of no evident avail. Repeated injections of immune serum for several weeks before infection has taken place might, however, confer protective passive

immunity for a short while, in view of Hallauer's¹³ experiments with herpes simplex.

In the first group of diseases in which virus is blood-borne, the chances of effective immunization by a proper inactive vaccine would seem to be far superior to those obtaining in the second group in which antibodies actively or passively acquired circulate but do not presumably come into contact with intracellular virus.

The interrelation of pathogenesis of a virus infection and immunity cannot, I think, be illustrated better than by reference to clinical pictures and experimental infections caused by the virus of the cold sore or fever blister. Herpes simplex infection in human beings has several rather distinct and characteristic clinical manifestations, and it is quite likely that each is due to the particular balance existing at the time between susceptibility and immunity of the host and to the peculiar intimacy that obtains between the virus and certain types of cell.

The common type of herpes in adults is the ordinary labial variety, but rather recently Drs. K. Dodd, L. M. Johnston and G. J. Buddingh,¹⁴ at Vanderbilt University Medical School have identified herpes simplex virus as the specific etiologic agent of a stomatitis of infants and children that heretofore has probably been included in an indefinite group of diseases to which pediatricians have given the name "aphthous stomatitis." These investigators consider herpetic stomatitis, which is sometimes accompanied by rather severe general symptoms, as representing a primary infection. This point of view is maintained also by Burnet and Lush¹⁵ who confirmed the previous work, and found further that children who had herpetic stomatitis possessed no virus-neutralizing antibody in their bloods. Following recovery however, anti-body was present.

It would appear that subsequent attacks of herpes, occurring most commonly in adult life, take place in individuals whose blood serums already contain antibody signifying previous infection and that these people show no herpetic virus in their saliva during or between attacks. The presence, therefore, of antiviral antibody in the blood is not preventive of herpetic infection of the lip but probably owing to previous infection, indicated by the presence of antibody, the clinical manifestation is different in that the intraoral mucosa escapes.

In a third type of herpetic infection the eruption breaks out repeatedly in the same area of skin, and sometimes in definite relation to a particular cutaneous nerve. In these cases, neutralizing antibody is also present in the blood.

It is an interesting adventure in speculation to try to interpret such varied phenomena in terms of known fact and acceptable current hypothesis. It seems evident in the first place that circulating neutralizing antibody in such concentration at least as exists under the circumstances, is ordinarily not sufficient to protect epithelial cells of the lip from infection with herpes virus from the outside. In those cases where the cutaneous eruption is definitely related to a particular nerve there is more difficulty in explaining the phenomenon of infection, and at the present time it seems most logical to conclude that the virus remains latent within nerve cells over long periods, manifesting itself by infecting epithelial cells when unknown conditions arise to permit restoration of its activity. This is possibly true also in the case of the usual labial herpes, for in many cases there is no evidence of contact with extraneous virus. If the assumption of latent herpetic infection of nerve cells be accepted then one must reckon with a complex and variable intracellular immunity mechanism, concerning the nature of which there is no knowledge.

It may be concluded from the observed facts that, ordinarily at least, cutaneous epithelium in itself does not possess innate immunity in those subject to herpes, but that a change resulting from an initial infection, indicated by a virus-neutralizing effect of serum alters the clinical picture and course of subsequent infections.

Herpetic virus is very infectious for the rabbit, and much knowledge of the host virus relation has been derived from experimental infections in this animal. Inoculated on the cornea the virus infects the epithelial cells, inducing an acute keratitis. With many strains of virus the infection does not stop at the eye but proceeds rapidly to the brain, following the course of fibers of the sensory division of the fifth cranial nerve and utilizing the medium of the axis cylinders as pathways for its invasive progress. Frequently the encephalitis is fatal. The blood stream is not at all or rarely invaded. Should an animal recover from its encephalitis it is immune to reinfection, even by intracerebral injection of many lethal doses for normal rabbits, and because little or no circulating antibody may be demonstrable there is some reason for the belief that a specific resistance has taken place in the neurones themselves.

Miss Katherine Anderson,¹⁶ at Vanderbilt, has recently observed, in her studies of herpetic infection of chick embryos, the sudden appearance of a variant of the virulent HF neurotropic strain of herpes virus (Rockefeller Institute), which has become so altered by chick embryo passage that it

causes only a mild acute keratitis in inoculated rabbits, the infection stops at the cornea, and there is no invasion of the brain. These rabbits become immune to reinoculation of the cornea with the virulent HF strain, and neither keratitis nor encephalitis may follow a heavy inoculation, but the brain may remain susceptible to infection if virus is injected intracerebrally. Here, then, is a case in which as a result of the experience of a previous peripheral infection the host has become resistant at the portal of entry, while remaining susceptible to virus that might break through to reach the nervous system. Protection of a natural portal of entry, however, would be adequate no doubt in the ordinary course of events to prevent disease, and the modified herpes strain represents a desirable type of variant for prophylactic inoculation.

In human infection with herpes virus and in that induced in rabbits there is no evidence of blood-borne metastasis. Recovery from infection, however, may be associated with the appearance of antiviral antibodies in the blood stream. The presence of such antibodies is not incompatible with susceptibility to reinfection, although the resulting disease might be different from the primary infection, at least in man.

In connection with the pathogenesis of this infection and with reference to immunity, the recent success of Miss Anderson¹⁷ in inducing blood-borne metastases in chick embryos is of great interest. She has been able to adapt a strain of herpes virus, by repeated membranous cultures, to the tissues of chick embryos. By passage in this host the virus has become modified in such a way that its virulence for the embryo has become greatly enhanced, and its capacity to infect cells of mesodermal origin, especially endothelium, has become augmented. As a result of this change, inoculation of the chorioallantoic membrane results not only in a local infection of that structure, but also in an extension by continuity and hematogenous metastasis to a number of internal organs, especially the liver, heart, spleen and kidneys. The mechanism of hematogenous dissemination seems to depend on the enhanced ability of the virus to infect the endothelial cells of blood-vessel channels, thus initiating foci of infection that spread to cells of the parenchyma. Hematogenous spread by endothelial infection has not, I believe, been previously observed in herpetic infection of other animals, and Miss Anderson's experiments introduce a new element into the problem of pathogenesis of this interesting experimental disease.

Because extension of the infection from the membrane to internal organs appeared to be by way of vascular endothelium, an opportunity was

presented to observe the effect of passive immunization by means of intravenous injection of hyperimmune hen serum on the course of the experimental disease, and Miss Anderson was able to show quite clearly that intravenous introduction of such an immune serum not only inhibited or prevented blood-borne metastasis, but likewise modified the local lesion and prolonged the life of the embryo.

Thus it has been shown experimentally that the presence of circulating immune bodies may not prevent a local herpetic infection of the skin or brain, but that passively conferred humoral antibodies may prevent spread of the infection by way of the blood stream if that spread is associated with infection of vascular endothelium.

If one accepts the possibility of latent herpetic infection of human neurones or other cells, it must be assumed that resistance to virus activity during inter-eruptive periods is dependent on a rather delicate and variable intracellular chemical or physical balance of a temporary nature and probably not dependent on antibody, because a great variety of conditions, such as hyperthermia and proteid and chemical intoxications, are readily followed by evidences of reactivated pathogenicity, as manifested by an eruption of labial herpes. The idea of lability of cells in respect to their susceptibility and resistance to viruses seems to be a rather hopeful conception, because it points to the possibility of modifying cells intentionally in the direction of increased resistance by chemical or other means.

Different methods are being used at the present time with varying degrees of effectiveness to control or modify virus diseases. These methods have already been mentioned, namely active immunization by infection with a mild virus, active immunization by injection of inactive virus material and passive immunization by the injection of immune serum.

Active immunization by infection with a mild virus started with Jenner, and has been successfully employed ever since in the prevention of smallpox. In the last few years the same principle has been employed in the prevention of yellow fever and of certain virus diseases of animals. The outlook for this method is very hopeful, for strains of viruses are readily variable, and it has been possible to modify some of them experimentally so that they may be more safely used as active vaccines.

Active immunization for protection against yellow fever was made possible by the work of Theiler,¹⁸ at the Harvard Medical School, which showed that this virus can be modified in its virulence and pathogenicity by passage through the

brains of mice. Thus changed, the virus no longer induced yellow fever when injected subcutaneously into susceptible monkeys. This modified, so-called "neurotropic" yellow fever virus has been used for human vaccination, but another strain has been employed on a larger scale and probably with less hazard after modification by repeated tissue culture.

Immunization with an active virus is most effective if actual infection is induced, but the induced disease must be mild and without important hazard if it is to be successfully applied in human prophylaxis. In some cases the use of an active virus so attenuated that it does not induce infection might be superior to an inactive product, because of better antigenic properties. This can be accomplished with some viruses by introducing them into tissues whose cells are not naturally susceptible. Pasteur, for example, finished his vaccinations for rabies with active virus in emulsions of rabbit cord injected subcutaneously, preceded by several injections of inactive material. It would, of course, be an unsafe procedure in any case to attempt human immunization with an infecting dose of virulent virus.

Injection of specific immune serum at a proper time will prevent or modify measles, and immunization with inactive vaccines has been used to protect against rabies, with, at least in the dog, uncertain success. Inactive preparations of the virus of equine encephalomyelitis cultivated in the chick embryo appear to be quite satisfactory in protecting horses and perhaps man. Antiviral antibodies appear in the serum of vaccinated animals following injections of the inactive vaccines in each of these cases, but in view of the circulation of virus in blood and the susceptibility of cells presumably of mesodermal origin in the case of equine encephalomyelitis, it is perhaps simpler to attribute protection against that disease to the presence of such antibodies—an assumption which is more questionable in the case of induced immunity to rabies, where the virus in the usual course of events does not necessarily contact circulating antibody.

Protection by vaccination with apparently inactive material against such a virus as rabies has raised the question in many minds as to whether the vaccines that do protect are entirely free of active virus, although the infection be inapparent. Unfortunately there is no way to be absolutely sure about this at present.

There is still hope, however, of inducing variations in obligate neurotropic viruses,—such as those of rabies and poliomyelitis,—similar to those already found in the case of the virus of small

pox and of yellow fever, that will induce without hazard a mild infection followed by immunity. In this connection I should like to mention briefly some recent experiments of Dr. James R. Dawson, Jr.,¹⁹ at Vanderbilt, with the virus of rabies.

Dr. Dawson has succeeded in infecting the brains of chick embryos with several strains of rabies virus, including a street virus, a fixed virus and a strain derived from human infection. After being passed through several generations by successive intracerebral inoculations of chick embryos with infected brain, the street virus was injected by the intracerebral route into rabbits. All of 19 rabbits thus inoculated developed acute encephalitis with fever and a peculiar weakness and incoordination of the muscles, especially those of the neck. Thirteen of the 19 recovered, and 4 of these selected at random were completely immune to a heavy intracerebral dose of street virus, while 2 controls that received one hundredth as much rapidly succumbed with rabies.

This, I believe, is the first time a strain of rabies virus has been so modified that it would induce an immunizing and self-limited acute encephalitis in any animal species. A similar alteration of virulence for the dog would very likely be of great practical importance in the control of this distressing disease, but the strain so altered in virulence for rabbits is still fatal for dogs, at least in large doses, although Dr. Dawson is hopeful of inducing further modification that will be of help.

In conclusion, I should like to reiterate my main thesis that a knowledge of pathogenesis of virus diseases is necessary to a complete understanding of immunity. The patterns of pathogenesis of these diseases are determined by the cell-virus relation, which depends on the requirement by the virus of the internal medium of living susceptible cells for multiplication. The portal of entry, the primary lesion and the dissemination and elimination of each virus depend on the accessibility of certain susceptible cells in each case.

Although the mechanism of immunity is not yet well understood, experimental investigations indicate that, in at least most cases, humoral antibodies are very important factors, although their presence does not always indicate immunity or explain its phenomena. It has not yet been proved that susceptible cells themselves can actively participate in creating the resistant state, although their role is not known. Immunity does not depend entirely on a state that prevents virus from entering susceptible cells. Immunity is relative, and with certain infections of man partial immunity will modify the clinical features of the disease.

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HYDRONEPHROSIS STANDARDIZATION OF SURGICAL TREATMENT*

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REFERENCE to the voluminous literature on hydronephrosis reveals a renewed interest in the last decade in the problem of ureteropelvic obstruction and its surgical correction. The historical aspect of this problem has been reviewed in detail by Mathe¹. Trendelenburg² is given credit for the first attempt at plastic repair in 1886, but his effort proved unsuccessful owing to death of the patient from intestinal obstruction. In 1891 Kuster³ reported the first successful plastic operation on the renal pelvis. His operation consisted in reimplantation of the excised ureter in the pelvis at its most dependent part. One year later, Fenger⁴ described a plastic operative procedure that he had done for the relief of hydronephrosis due to valve formation and stricture of the ureter. This consisted in longitudinal incision at the point of obstruction, with transverse closure, an adaptation of the Heineke-Mikulicz principle used in intestinal surgery. Study of the many types of plastic procedures subsequently applied to the correction of ureteropelvic obstruction shows a fairly close parallelism to methods that have become more or less standard in gastrointestinal surgery. The stimulus of this early work led to an era in which the renal pelvis became the recipient of surgical attention that was perhaps more enthusiastic than discriminating. There were many failures, and even those cases in which the results were termed successful must be accepted with reservation, since they antedated the

development of urography with its present-day precision in the evaluation of surgical end results. Even at the present day, no one is justified in citing an end result as successful without the evidence of urography after a sufficient postoperative period has elapsed. Silent destruction of the kidney may occur postoperatively and give a false impression of cure unless checked by careful urological investigation.

That the earlier enthusiasm for conservative plastic surgery waned or fell into disfavor is evident from a review of the discussion of hydronephrosis that occurred at the German Urological Congress in Vienna in 1921, where the fact was disclosed that up to that time nephrectomy was the generally accepted operation for hydronephrosis. Since then there has been a gradual recrudescence of interest in conservative plastic surgery, which received a real impetus in the symposium on hydronephrosis participated in by Von Lichtenberg, Walters, Quinby and others at the annual meeting of the American Medical Association in 1929. Reference to the symposium on hydronephrosis of the American Urological Association at Minneapolis in 1937 furnishes a good cross-section of the progress that has been made in the last decade, and other noteworthy contributions in the last few years have served to establish the plastic surgery of ureteropelvic obstructions on a firm foundation.

However, in spite of this progress it is still the common practice to perform nephrectomy on many

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hydronephrotic kidneys that might have been saved by plastic surgery. Reasons for this unfortunate state of affairs, as enumerated by Ormond,⁸ are unfamiliarity on the part of the profession with the methods that can be employed, lack of confidence in plastic operations as a remedy for hydronephrosis, and lack of agreement as to the

renal Trendelenburg operation, and is similar to the Finney pyloroplasty. Von Lichtenberg's operation is a variation of the same fundamental principle. In the presence of a vascular band containing an artery too large to sacrifice with safety, Young's⁶ plastic procedure may occasionally be applicable, although most surgeons have surmounted this prob-

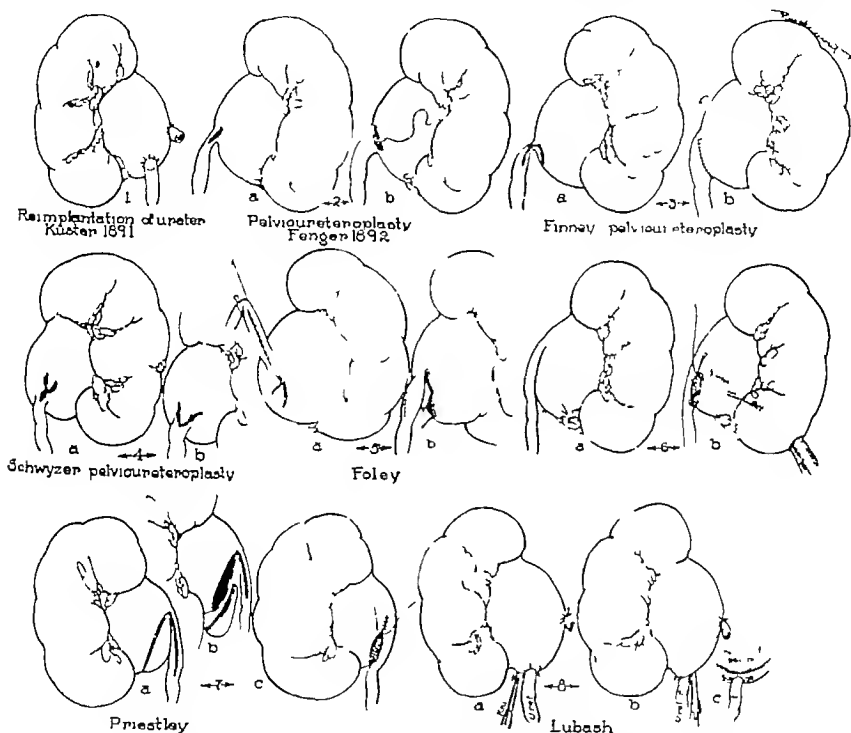


FIGURE 1 Sketches illustrating the Main Types of Pyeloureteroplasty Now in Vogue

preferable type of operation and lack of standardization of procedure.

In the surgical correction of ureteropelvic obstruction, four basic methods have been oftenest used (Fig 1). These are as follows: reimplantation of the excised ureter in the pelvis at its most dependent part (Küster), longitudinal incision, with transverse closure (Fenger), the Y incision with the V closure (Schwyzer, Foley), and some type of lateral anastomosis, either with the pelvis or another portion of the ureter (Trendelenburg, Priestley).

The fourth type of repair is essentially the orig-

inal Trendelenburg operation, and is similar to the Finney pyloroplasty. Von Lichtenberg's operation is a variation of the same fundamental principle.

In the presence of a vascular band containing an artery too large to sacrifice with safety, Young's⁶ plastic procedure may occasionally be applicable, although most surgeons have surmounted this problem by the first method enumerated above. Figure 2 shows my modification of the Fenger operation.

A study of the literature reveals that no one of the methods used in the past has been an unqualified success. Statistical reviews of end results of plastic operations in the more recent series reported indicate failure in anywhere from 15 to 33 per cent of cases.

Reasons for failure are enumerated by Lubash⁷ as follows: leakage of urine and perirenal infection at the point of anastomosis, tension along the suture line with secondary infection, puckering

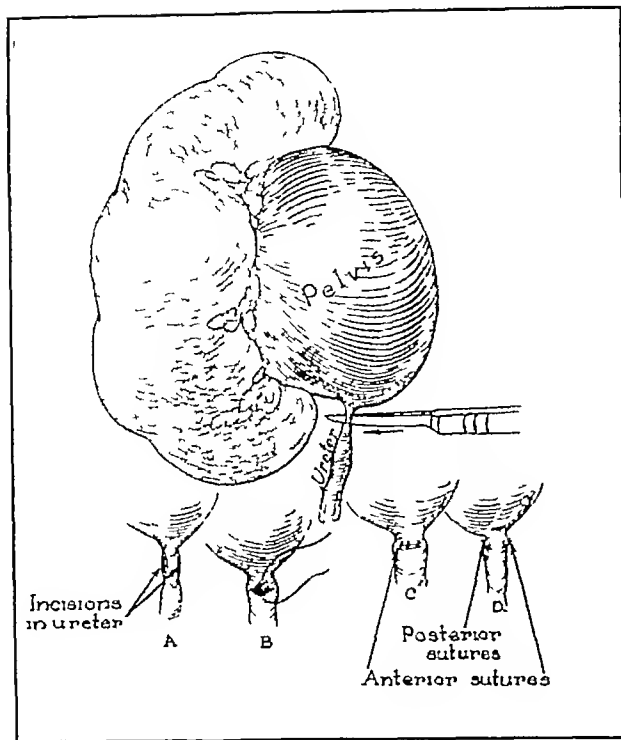


FIGURE 2 Drawing Illustrating the Author's Modification of the Fenger Operation

A Bard-Parker No 11 blade is used to transfix the strictured area at the ureteropelvic junction. This might be termed a double Fenger operation. It is suited to Type I hydronephrosis, but as a rule the Rammstedt procedure is preferred because of its simplicity, and the facts that incision is not made into the lumen of the ureter and that no suturing is necessary

and buckling at the line of anastomosis, new stricture formation, acting as a boomerang, retention of urine and secondary pyelonephritis or cortical abscess formation, and persistent urinary fistula.

It is evident that the present methods of surgical treatment of hydronephrosis leave much to be desired, and it is therefore appropriate at this time to take an active interest in the problem of saving hydronephrotic kidneys from nephrectomy or ultimate destruction through unsuccessful plastic surgery. I believe that there are still more fundamental reasons for failure which have not previously been sufficiently stressed, and that more uniform success will follow the adherence to two simple types of surgical procedure adapted to the two main types of hydronephrosis.

Obstructions at the ureteropelvic outlet fall naturally into two main groups (Fig 3). Type I, stricture of the ureteropelvic junction, and Type II, valve formation caused by high insertion of the ureter into the pelvis.

Both types are frequently complicated by extrinsic factors such as compression or kinking at the ureteropelvic juncture caused by bands, either fibrous or vascular, by ptosis or by adhesions, either inflammatory or congenital. Figures 4 to 9 show the successive steps of the two operations which in my experience are best adapted to these two types of hydronephrosis. The first necessity is, of course, the removal of all obstructing bands and adhesions, in other words, a thorough pyelo-

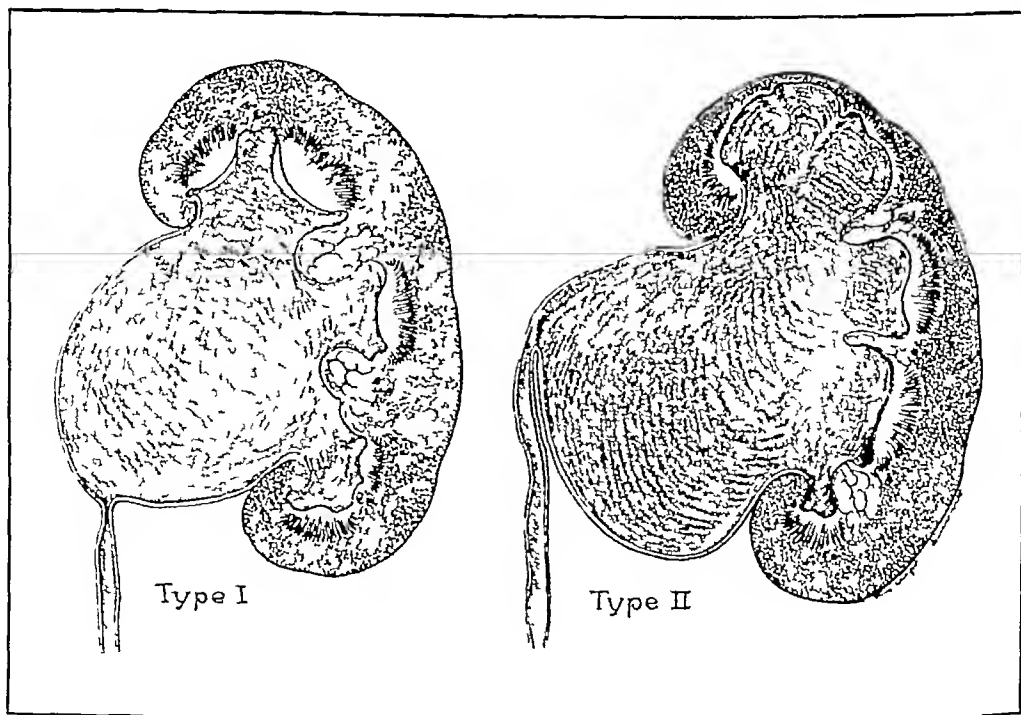


FIGURE 3 Drawings Illustrating the Two Main Groups into Which All Cases of Hydronephrosis Fall

Type I—stricture of the ureteropelvic junction

Type II—high insertion of the ureter with angulation and valve formation

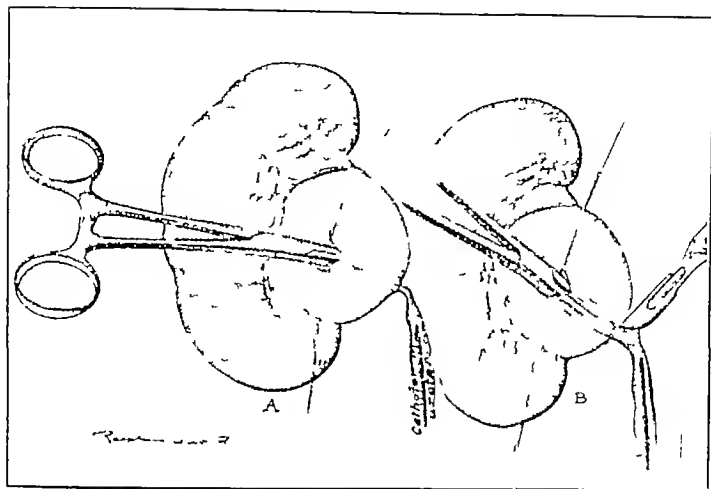


FIGURE 4 Operation for Type I Hydronephrosis

These drawings and those in Figures 5 and 6 illustrate the technic of the operation. Through a pyelotomy incision the strictured ureteropelvic junction is dilated with a hemostat and externally several parallel vertical incisions are made down to the mucosa as in the Ranstedt operation.

ureterolysis. This is followed by one or the other operation, depending on whether the hydronephrosis is Type I or Type II. In either case no

sutures are used, and the ureteropelvic opening is maintained by adequate splinting and nephrostomy drainage, the most important single element in obtaining a successful result. I should not eschew the use of sutures entirely, but wish particularly to emphasize the relative importance of splinting. No matter how generous the surgeon is in the use of sutures in plastic repair, the outcome is likely to be a failure unless he makes use of splinting; conversely, if he places his dependence on adequate splinting the result will almost certainly be successful even though he uses no sutures at all. The value of the ureteral splint has been emphasized by Peck,⁸ and later by Harris,⁹ Cabot,¹⁰ Moore,¹¹ Sargent,¹² Priestley,¹³ and others, but has not received the attention it deserves. It should be maintained in situ post-operatively for ten days to three weeks or even longer, depending on the extent of deformity and infection. It is hardly necessary to state that infection should be eliminated, so far as possible, by preoperative treatment. If ptosis is present, nephropexy should be included in the operative treatment. In the occasional case of slight hydronephrosis of a possible dynamic nature where mechanical obstruction is not a clear-cut factor, I have also performed renal sympathectomy in order to make doubly sure of relieving the patient of pain. In other cases that do not run quite true to type additional measures, such as excision of a portion

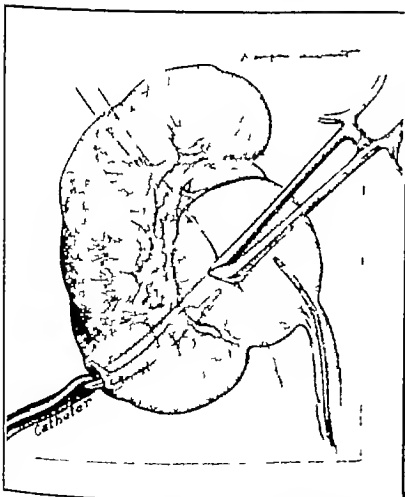


FIGURE 5 Operation for Type I Hydronephrosis

The point of the hemostat is pushed out through the lower major calyx and a double-eye Robinson catheter No. 18 or 20 Fr. is pulled into the pelvis.

of the hydronephrotic pelvis where it is excessively redundant, may be indicated

The procedures here advocated are characterized by their simplicity and the ease and speed with which they can be performed. Difficult technical practices and complicated methods of suture

The following report will serve to illustrate my point

G C, a 25-year-old woman, had a congenital solitary left kidney with advanced hydronephrosis. She entered the hospital in an almost moribund condition, due to acute fulminating pyelonephritis with fever, nausea and

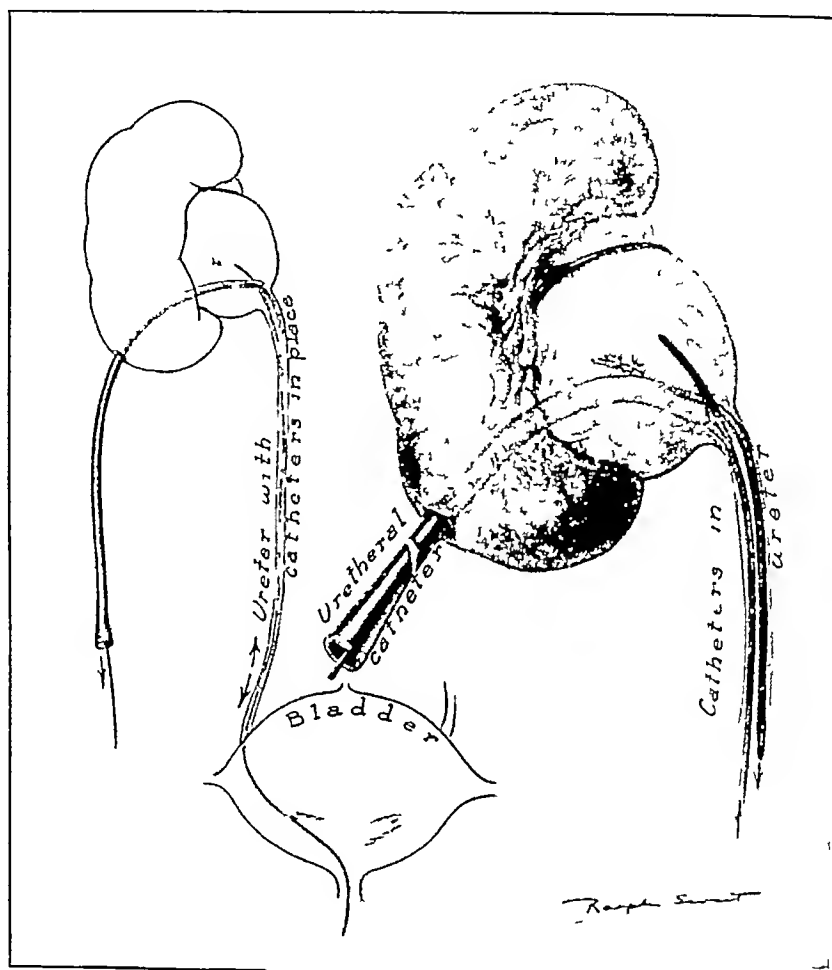


FIGURE 6 Operation for Type I Hydronephrosis

These show the conclusion of the operation, with the method of nephrostomy drainage and ureteral splinting. Prior to operation a No 7 Fr ureteral catheter is passed to the kidney through the cystoscope. After the Robinson urethral catheter is drawn into the pelvis a second No 7 Fr ureteral catheter is passed in through the Robinson catheter, emerging from one of the openings, and is passed down the ureter along side the ureteral catheter already in place. This provides adequately for two-way drainage and irrigation of the pelvis, and doubly splints the ureter.

are entirely eliminated. One may well question the value of sutures in the attenuated tissues of the hydronephrotic pelvis complicated by the presence of urine and more or less infection. In those cases of elaborate plastic operation and delicate suturing in which the outcome has been favorable, the result may well be attributed to the adequate use of splinting rather than to the plastic procedure itself.

vomiting, and repeated chills. A No 7 Fr whistle tip ureteral catheter was successfully passed cystoscopically to the kidney pelvis and was left in place for drainage. There was moderate improvement, with the aid of repeated clyses and urinary antiseptics, but on the whole the course was stormy for the next 2 weeks, with the temperature never normal. Eventually it became impossible to get a catheter back through the obstruction at the ureteropelvic junction after it had become displaced, and the patient promptly lapsed into her original almost moribund state, with high fever and chills.

An emergency operation was performed with the sole purpose of providing nephrostomy drainage with all possible dispatch because of the patient's precarious condition. The kidney was quite large, grayish soft and flabby and the cortex was spotted with innumerable small whitish abscesses the size of pinheads. The perirenal and peripelvic tissues were very edematous and friable, and easily dissected away permitting an excellent view of the pelvis and ureteropelvic outlet. The condition proved to be a characteristic Type II hydronephrosis with high insertion of the ureter and an obstructing vascular band contain-

ing a retrograde pyelogram before operation, while Figure 10B shows an excretion urogram demonstrating the condition of this solitary kidney 6 months later. The urine was sterile on culture and free from pus cells. A phenolsulfonephthalein test showed an output of 60 per cent in 2 hours. Three years later the patient wrote that she had remained perfectly well.

COMMENT

The ultimate result of the preliminary drainage operation in this case was so satisfactory that a secondary plastic operation appeared to be entirely unnecessary. This experience presented considerable food for thought and raised a question as to the rationale of the plastic operations on hydronephrosis that are in general use at the present time. I question the necessity for complicated plastic procedures with elaborate suturing, which are more or less time-consuming, and one questions how well such sutures hold in the attenuated and devitalized tissues of the obstructed pelvis in the presence of urine and varying degrees of infection. I reiterate that reliance on adequate splinting rather than sutures will give a higher percentage of successful end results. An orthopedist would not think of reducing a fracture without a splint to hold it in proper alignment during the healing process. This orthopedic principle can be borrowed by the urologist to good advantage. McArthur¹⁴ has shown that the splint can be successfully used to bridge a hiatus in the ureter where there has been an interruption of its continuity and J¹⁵ have stressed the value of the ureteral splint following removal of calculi from the kidney pelvis or upper ureter which is obstructed or distorted and kinked by dense adhesions. It may occasionally be advantageous to use sutures in conjunction with splinting, but they are of secondary importance and should be employed sparingly, and one should meticulously approximate the cut edges, avoiding puncture of the mucosa if possible. No 00000 chromic catgut appears to be the most suitable material for plastic work.

Judgment in the selection of cases for plastic operation deserves a word of comment. Functional tests conducted preoperatively are generally misleading, as well shown by Schulhof and Cabot.¹⁶ Even in the presence of a normal mate, nephrectomy should never be decided on unless the kidney has been actually viewed at operation and found to be only a thin walled sac without an appreciable amount of parenchyma, or unless infection has destroyed the parenchyma beyond hope of recovery. Preoperative functional tests may indicate more or less complete functional impairment, yet at operation a considerable amount of normal looking parenchyma may be found which will surprise one with the degree of functional resto-

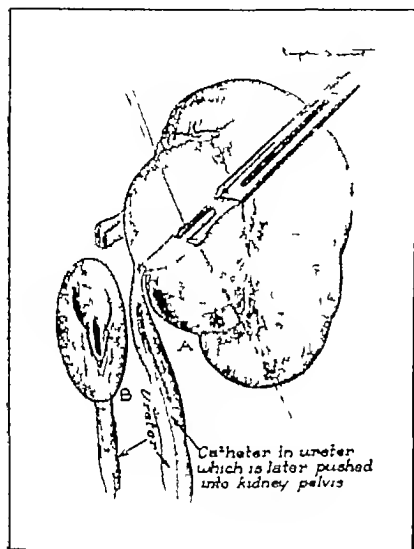


FIGURE 7 Operation for Type II Hydronephrosis

This drawing and that in Figure 8 illustrate the technique of the operation. A No. 7 Fr. ureteral catheter is passed up the ureter prior to operation. A pyelotomy incision is made and the valve-like partition caused by the high insertion is incised downward with scalpel or scissors as far as necessary to provide a wide opening at the ureteropelvic junction with dependent drainage. The end of the catheter if not already in the pelvis is advanced until it is well within

ing a rather large vein. The band was quickly resected, the pelvis opened and ureteropelvic junction incised downward. Nephrostomy drainage and ureteral splinting (as in the Type II operation) concluded the operative procedure. No sutures were used first because of the need for haste, and secondly because the tissues were too soft and friable to hold a suture. My plan was first to provide nephrostomy drainage, and if the patient did not succumb to perform some sort of plastic operation at a later date.

Immediately following operation the patient began to improve. The nephrostomy drainage and splinting were maintained for 3 weeks. After removal there was no leakage of urine through the wound which promptly healed, and the patient made a rapid recovery. Figure

ration that will occur following a successful plastic operation, even in the presence of a normal mate

This paper has been purposely limited to the discussion of non-calculous obstructions at the ureteropelvic juncture. It should not be necessary to emphasize that hydronephrosis may be due to

form of bands, adhesions, anomalous vessels, ptosis and so forth, as previously enumerated. Extrinsic factors may alone cause hydronephrosis, and their removal will result in cure without the necessity for plastic operation in the absence of intrinsic factors

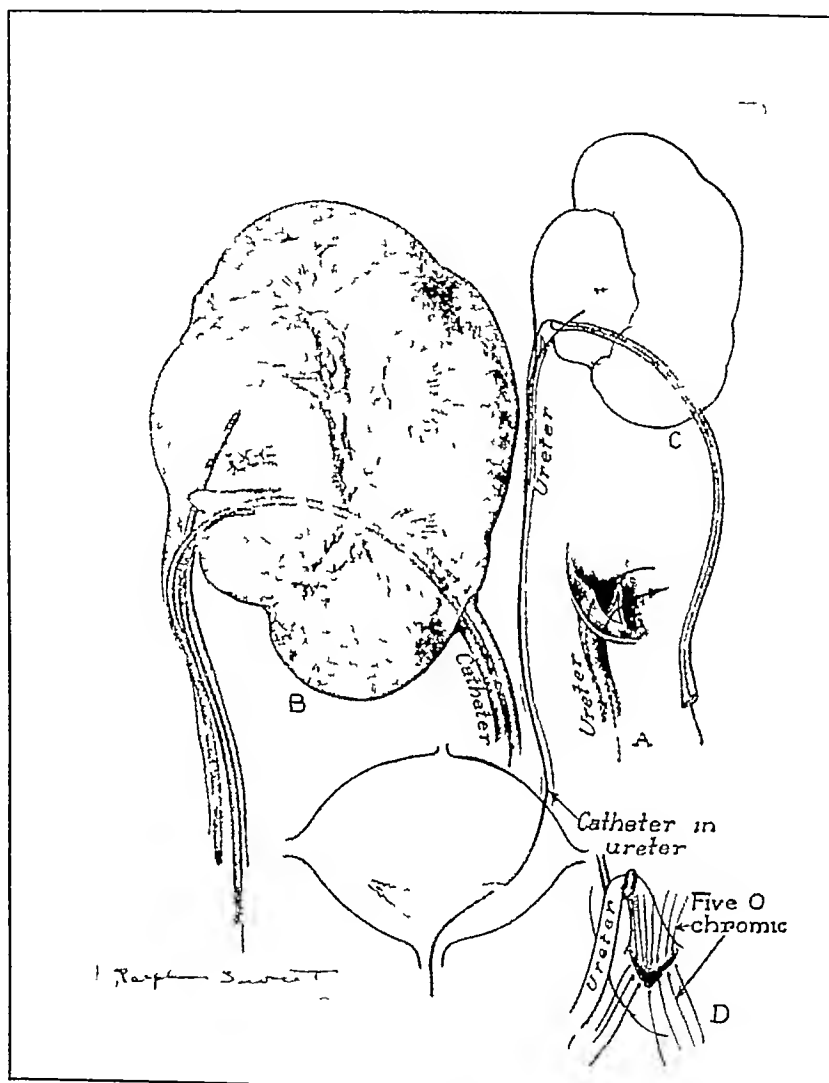


FIGURE 8 Operation for Type II Hydronephrosis

This drawing illustrates the method of nephrostomy drainage and double ureteral splinting, which is the same as in the Type I operation. The entire procedure is easily and quickly performed. No sutures need be used except to close the pyelotomy incision, and even these can be dispensed with. Nephrostomy drainage is preferable to pyelostomy drainage because the renal parenchyma splints the tubes and maintains them in accurate position with a greater degree of certainty. Sutures as shown in D are optional.

a great variety of obstructions at any point below the level of the renal pelvis, even to the external urethral meatus, and that accurate differential diagnosis requires their elimination before resorting to plastic surgery on the ureteropelvic juncture.

Types I and II hydronephrosis may be properly termed intrinsic types. They are usually complicated by one or more extrinsic factors in the

The question arises as to whether hydronephrosis due to obstruction at the ureteropelvic juncture can ever be relieved by cystoscopic dilatations. Rarely, Type I hydronephrosis can be relieved in this way, provided there are no complicating extrinsic factors, but most of the cases will require surgical relief.

A more general comprehension of the fact that

the vast majority of cases of hydronephrosis fall into two groups or types, susceptible to correction with a fair degree of certainty by one or the other of two simple types of operation should result in fewer nephrectomies and in a higher per-

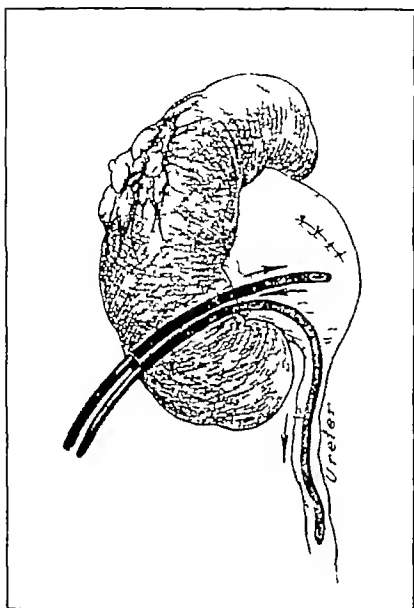


FIGURE 9 An Alternative Method of Nephrostomy Drainage and Ureteral Splinting

Following the necessary plastic procedure two small Robinson urethral catheters No. 10 or 12 Fr may be drawn into the pelvis and one passed down the ureter safely beyond the point of obstruction. Additional openings are made in these catheters at strategic points as shown in the sketch

centage of successful end results in the plastic repair of hydronephrosis.

CONCLUSIONS

The present status of the surgical treatment of hydronephrosis is briefly reviewed. Nephrectomy is still too often resorted to because of lack of confidence in plastic operations. The principal types of plastic operations in current usage are described and illustrated. Statistical summaries of end results show a relatively high percentage of failures, and point to the necessity for a re-evaluation of the types of hydronephrosis and standardization of methods of surgical treatment.

Hydronephrosis due to ureteropelvic obstruction

falls into two general groups, described as Types I and II

Two operative procedures are proposed, which seem best adapted to the surgical treatment of hydronephrosis. They are characterized by simplicity and ease of performance, with emphasis on the necessity for nephrostomy drainage and ureteral splinting, with elimination of sutures

Experience with these procedures suggests the possibility of eliminating elaborate plastic operations and the delicate suturing that they entail, in favor of simpler procedures which will decrease the number of nephrectomies for hydronephrosis and give greater assurance of successful end results

450 Sutter Street.

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DISCUSSION

DR. CLYDE L. DEXING, New Haven, Connecticut: I have for a long time been looking at hydronephrosis simply from an operative standpoint. In 1925 or 1926 I reimplanted a ureter in the wife of a young doctor friend of mine. He was not a urologist but a surgeon, and he knew quite a bit about surgery of the kidney. The morning after the operation Dr. Quinby published a paper in which he asserted that this operation should never be performed. Fortunately however this case proved to be one of the most successful I had ever treated. I encountered a large cystic mass at the point of anastomosis. The patient had had frequent urinautions since childhood and had been through one pregnancy. She has remained free from infection.

There is nothing more intriguing to me than the correction of hydronephrosis, and I am indebted to Dr. Gibson in reducing this treatment to logical terms and rendering it both simple and efficacious.

DR SAMUEL N VOSE, Boston Dr Gibson's operations seem logical I have used the Rammstedt operation with satisfaction I have employed for a splint, with satisfactory results, a single catheter in the cortex, with holes cut corresponding to the pelvis

I should like to mention the significance of minor degrees of hydronephrosis as regards pain and a predisposition to infection and stone formation Compensation has been widely recognized Compensated bladders carry a good deal less residual urine in the presence of bladder-neck obstruction than do decompensated ones The same thing applies to the kidney pelvis In the presence of a good deal of obstruction, extrarenal pelvis usually show extensive hydronephrosis, while in the intrarenal pelvis the kidney cortex is more apt to suffer

DR GIBSON (closing) It may be that we need a hydronephrosis registry, as we need a carcinoma registry, in order properly to evaluate and standardize the operations for plastic repair of hydronephrosis I have been appalled at seeing many doctors, not only general surgeons but also urologists, remove fairly good kidneys capable of a marked amount of functional restitution rather than attempt a plastic operation, because they lacked confidence in it. Certainly if one lacks confidence one is inclined to do a nephrectomy, because if a plastic operation is not successful the patient may require a second operation involving nephrectomy, which does not redound to the credit of the surgeon. Appraisal of results attendant on adherence to the principles of plastic repair above outlined limits the indications for nephrectomy to those kidneys which are hopelessly destroyed

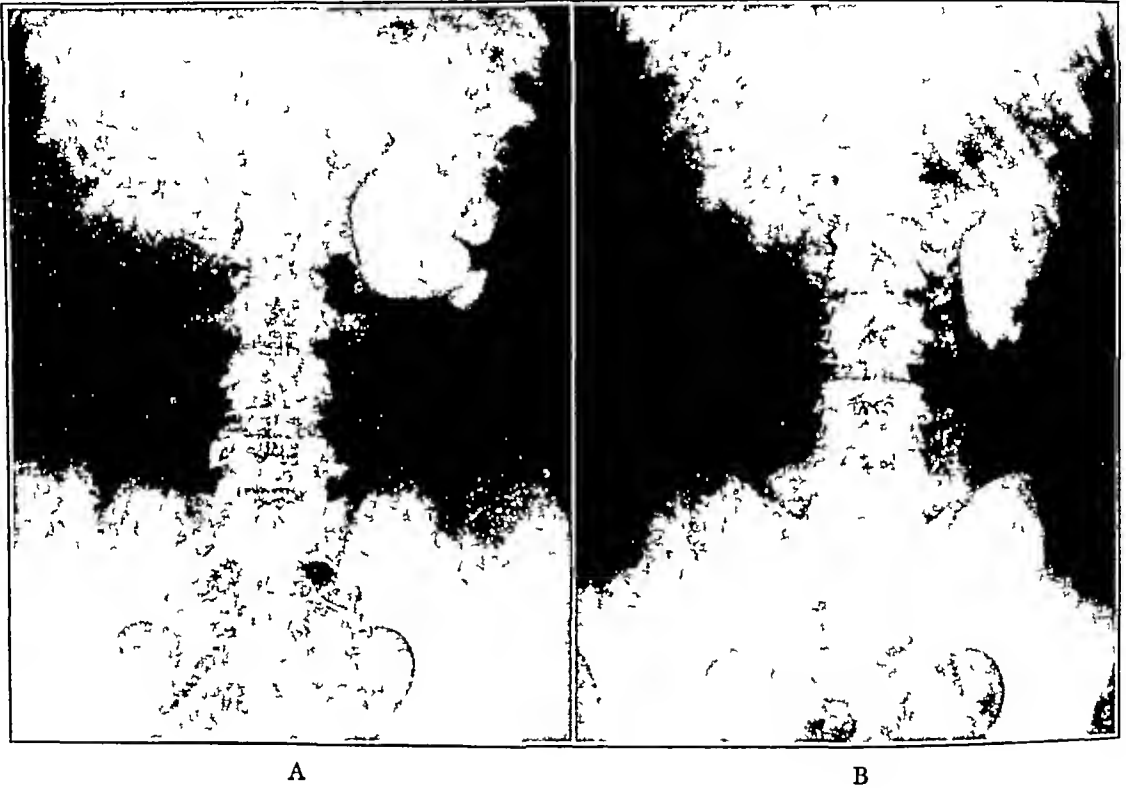


FIGURE 10 Results of Operation

A—photograph of retrograde pyelogram in a twenty-five-year old woman, with a Type II hydronephrosis of a congenital solitary left kidney complicated by acute pyelonephritis B—photograph of excretion urogram six months after operation There were excellent restoration of function, complete elimination of infection and adequate dependent drainage

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It has been asked, In the presence of how much infection should one attempt a plastic operation? Of course, one should try to clear up infection prior to operation, but I should not hesitate to operate in the presence of considerable infection, relying on ureteral splinting and nephrostomy drainage

APPENDICES EPIPLOICAE*

GEORGE A. MOORE, M.D.†

BROCKTON, MASSACHUSETTS

THE early literature regarding appendices epiploicae has been reviewed in considerable detail by several writers in the past two decades, notably Hunt,¹ Klingenstein² and Patterson.³ Only a very brief summary therefore will be given here of the more important contributions to this subject in the past.

In 1703 Littre⁴ discovered a pea sized foreign body in the abdominal cavity that was thought to be the remains of an appendix epiploica. Cruveilhier⁵ (1849) and Deville⁶ (1851) also described foreign bodies in the abdominal cavity, which were assumed to have a similar origin.

In 1863 Virchow⁷ gave a detailed description of the formation and composition of foreign bodies in the abdomen and claimed that the majority had their origins in appendices epiploicae.

In 1905 Ruedel⁸ published the first comprehensive study of the clinical aspects of 8 cases illustrating the various pathologic conditions associated with appendices epiploicae.

Robinson's⁹ thesis, published in 1908, on the anatomy and pathology of the "seroappendices," is the most painstaking study of the subject that has yet appeared. He stated that the dog, cat, rabbit and rat have no seroappendices, but that the anthropoid ape has seroappendices similar to those found in man. Contrary to other writers, he stated that the appendices are found in the fetus at two and three months, as well as in the newborn. Robinson's detailed description of the anatomy, physiology and pathology of appendices epiploicae is still generally accepted.

Anatomically appendices epiploicae are pedunculated tabs of fat attached to the colon, covered only with peritoneum, which vary greatly in size, shape and number. They extend from the cecum to the rectum, usually in two rows, one in relation to the anterior tenia and the other in relation to the posterior internal tenia. The largest appendices are usually found on the sigmoid. They are true hernias of the visceral peritoneum, filled with fat.

The physiological function of appendices epiploicae has never been definitely established. Robinson⁹ has suggested that they are a factor in the movements of fluids in the colon.

The pathologic conditions which involve appendices epiploicae and the approximate number of

times they have been reported are as follows: foreign bodies, 15; intra abdominal torsion, 43; intra hernial torsion and strangulation, 15; intrahernial incarceration, 16; and adhesions resulting in intestinal obstruction, 7. As additions to these I submit herewith 2 cases of intra abdominal torsion, 1 case of adhesion incarceration in a hernial sac, causing strangulation of a loop of the sigmoid, and 2 cases of intra abdominal adhesions resulting in acute intestinal obstruction.

Foreign bodies which lie in the abdominal cavity or in a hernial sac originate in most cases from gradual torsion of appendices epiploicae and give rise to no symptoms. It is quite probable that most cases of acute torsion require early operative relief and hence do not result in the formation of foreign bodies. In Virchow's⁷ case, death resulted from peritonitis apparently from a foreign body originating in an appendix epiploica attached to the vermiform appendix. Ruedel⁸ cited a case with symptoms of "gall-bladder adhesions" in which only fatty foreign bodies were found. He also described a patient with abdominal pain from a hernia, who was relieved by removal of a small, fatty foreign body from the hernial sac. The potential danger of infection from any foreign body in the abdomen is generally recognized.

Torsion occurs more frequently than any other pathologic process in appendices epiploicae. Chronic and acute types of torsion are found at operation, the acute torsion is more frequently observed, as it is commonly accompanied by urgent symptoms which necessitate operation.

The chronic type is probably the cause of many foreign bodies in which a gradual saponification of the fat content has occurred, followed by calcification or the formation of pseudo-cartilaginous bodies. Chronic torsion is the cause of certain types of adhesions producing intestinal obstruction, which will be described later. It is quite probable that a certain number of cases with unexplained mild attacks of abdominal pain are due to chronic torsion of an appendix, which terminates in a foreign body or adhesions.

Many patients in whom acute torsion is found at operation give a history of numerous attacks of abdominal pain in the past. Cases of torsion have been reported (Huot¹⁰) in which no history of acute symptoms was obtained and the strangulated appendix epiploica was an incidental finding at operation. In most patients, however, there

*Read by title at the annual meeting of the New England Surgical Society, Boston, Massachusetts, September 29-30, 1939.
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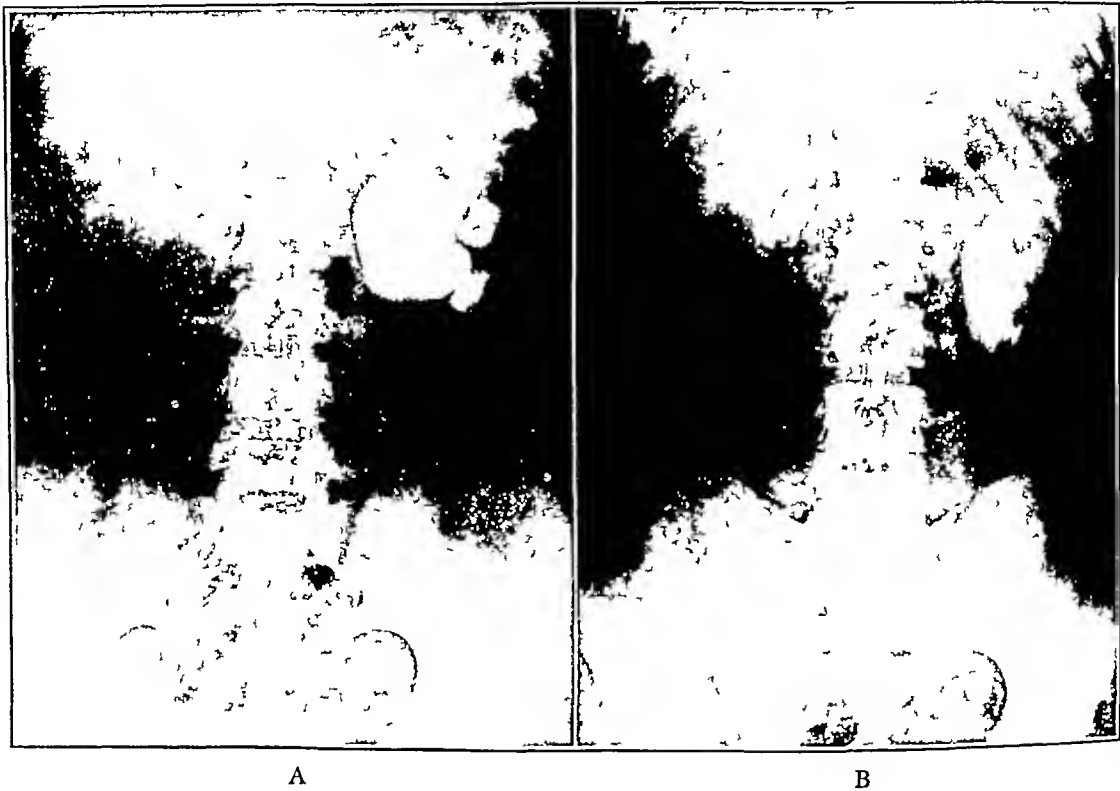


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DR. HERBERT H. COLBY, Boston Dr Gibson has made The successes I have had in the pelvic junction have been the ureter or with the I no success with the ly because I do not know an Dr Gibson discuss the How is one to tell when aged and its mate has taken also like to know how much still do a successful plastic I should like to ask interred sloughing of the operation

Dr Colby spoke of reimplantation In the original Küster operation the ureter is resected and reimplanted in the most dependent portion of the pelvis. The only case in which this procedure is followed is that of an anomalous vessel, an artery that is too large to sacrifice safely This does not occur very often Here also the key to success is adequate splinting and nephrostomy drainage. I have not seen any sloughing of the mucosa as a result of splinting It has been asked, In the presence of how much infection should one attempt a plastic operation? Of course, one should try to clear up infection prior to operation, but I should not hesitate to operate in the presence of considerable infection, relying on ureteral splinting and nephrostomy drainage

testinal obstruction. Whether the inflammation is preceded by torsion has not been determined. In certain cases, torsion is definitely the cause, as it is found that the appendix has dropped off, that the proximal stump has adhered to the parietal peritoneum, mesentery or intestine, and that a loop of intestine has slipped in back of the cord thus formed and has thus become strangulated. In one of my patients (Case 5) fully a third of the small intestine was strangulated in this way. The other two processes causing obstruction are adherence of an appendix epiploica to the parietal peritoneum or viscera and adherence of two inflamed appendices across a loop of intestine. Baumeister, Hargens and Morsman¹⁶ collected 6 cases of intestinal obstruction from the literature, and added 1 to the list. The following 2 cases occurred in my practice, bringing the total number to 9.

CASE 4 M. A. P. (No. 7543) a 75-year-old married woman, entered the Moore Hospital Brockton Massachusetts, on May 3 1933. She had had a total hysterectomy at another hospital in 1905. There had been no serious illness since operation, but she had been quite constipated in recent months. About 30 hours before admission she was seized with severe epigastric pain, nausea and vomiting and complained of marked tenderness in the left lower quadrant, which had persisted.

On physical examination the patient was of good color. The blood pressure was 124/90. The abdomen was moderately distended and extremely tender with spasm over the entire left side. The temperature was 97.6 F and the white-cell count 10,500. A flat x-ray plate of the abdomen and a barium enema showed evidence of small bowel obstruction.

At operation an appendix epiploica was found on the outer aspect of the descending colon. It was attached to the parietal peritoneum in the left flank. Beneath the band thus formed about 45 cm. of lower ileum was strangulated. When the band was severed the strangulated bowel appeared viable. Enterostomy was done above the site of the obstruction, which emptied the obstructed intestine. The patient appeared to be making a good recovery for 4 days and then developed pneumonia and died seven days after operation.

The discharge diagnoses were strangulation of a loop of ileum by a fibrous band resulting from an adhesion of an appendix epiploica to the parietal peritoneum in the left flank, and pneumonia.

CASE 5 P. W. (No. 8045) a 23-year-old unmarried woman entered the Moore Hospital Brockton Massachusetts, on April 17 1934. Her general health had been excellent in the past. The bowels were regular but the catamenia were irregular and accompanied by pain. About 5 months previously she had had an attack of epigastric pain, which was followed by a bowel movement which contained bright blood. Gastrointestinal x-ray films were taken, with inconclusive findings. Since then she had had two similar attacks. About 6 hours before admission,

while straining at stool she was seized with severe epigastric pain, nausea and vomiting. She became very pale, was faint, had a subnormal temperature and continued to vomit until she was admitted to the hospital.

On physical examination there was marked pallor. The skin was moderately cool. The blood pressure was 100/60. The temperature was 96.8 F., and the white cell count 11,000. The urine was normal. Nothing abnormal was found except moderate distention of the lower abdomen with tenderness in the left lower quadrant.

Following the usual preoperative therapy a left paramedian lower abdominal incision was made. Approximately a third to half the small intestine was strangulated by a taut small cord arising in the lower descending colon and attached to the base of the mesentery of the small intestine. No appendix epiploica was found at the distal end of this cord, but from its site of origin the latter was assumed to be a greatly stretched pedicle of an appendix epiploica. The band was excised, the strangulated intestine proved to be viable, and convalescence was uneventful.

The discharge diagnosis was strangulation of the small intestine by a fibrous band resulting from an adhesion of an appendix epiploica.

SUMMARY

It has been suggested by Patterson⁴ that diseases or better, pathologic conditions of appendices epiploicae occur more frequently than are reported in the literature. These conditions may well account for many cases of intestinal obstruction due to congenital bands of undetermined origin, and for certain cases explored for an acute abdominal episode in which no pathologic lesion is found.

An attempt has been made to emphasize some of the important facts in the literature regarding these uncommon lesions of appendices epiploicae, in the hope that a search will be made for them in acute abdominal conditions without obvious cause.

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REPORT ON MEDICAL PROGRESS

PATHOLOGY

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BOSTON

HYPERTENSION AND RENAL DISEASE

THE CLOSE relation between renal disease and elevation of the arterial blood pressure has been common knowledge for three quarters of a century, but only within the last six years has convincing experimental evidence regarding the possible mechanism of this relation appeared. Through the intervening period innumerable clinical and anatomical studies served gradually to distinguish between the primary nephropathies with secondary elevation of the blood pressure and a syndrome which became known as "essential hypertension," in which high blood pressure preceded by long periods the development of any other clinical or functional evidence of renal impairment. Clinicopathological correlation, however, clearly demonstrated that very few of these patients at postmortem examination failed to show extensive arteriolar disease, particularly within the kidneys, though functionalist and morphologist futilely battled for decades over the precedence of the hypertension or the arteriolar degeneration.

Through the period from 1925 to 1935 pathological interest focused sharply on the details of the vascular lesions in nephrosclerosis and on their correlation with clinical types of hypertension. A "benign" and a "malignant" form were widely recognized, and exhaustive studies¹⁻⁶ of long series of cases were published affirming or denying the identity of the two types and the possibility of accurate clinicopathological correlation. The difficulties of histological distinction were attested by the considerable variation of the supposedly pathognomonic criteria, various authors emphasizing in turn periarterial granulomatous reactions,¹ necrotizing arteriolitis,³ endarteritis, alterative glomerulitis,⁵ and so forth as of pre-eminent importance, till the intricacies dazed even the professional morphologist.

In 1934 attention was suddenly shifted in a more profitable direction by the publication by Goldblatt and a group of associates⁶⁻¹⁶ of the first of a series of experiments on the production of hypertension and its physiological mechanism. If a clamp was placed on the renal artery which narrowed but did not occlude the latter, the systemic

blood pressure rose significantly for a period of weeks. If the clamp was removed or the ischemic kidney resected the blood pressure fell to the previous control level. The hypertension was therefore clearly dependent on the presence in the body of ischemic renal tissue. Bilateral narrowing of the renal arteries or unilateral narrowing with nephrectomy of the opposite sound kidney produced severe and apparently permanent hypertension. The experiments were quickly and widely confirmed,^{17, 18} and a wealth of investigation has been stimulated which may well prove to be only in its infancy. New methods of producing renal ischemia and consequent hypertension have been developed, such as exposure of the kidneys to x-rays (Hartman¹⁹) and enveloping them in a bag of cellophane (Page²⁰), which provokes the formation of a dense fibrous constricting capsule. Removal of the encapsulated kidney promptly brings the blood pressure back to normal, just as in the Goldblatt experiments.

It is clear that the nervous system is not directly responsible for the genesis of the hypertension, since renal denervation,^{21, 22} total sympathectomy²³ or total destruction of the spinal cord by pithing²⁴ does not prevent its development.

With a neural mechanism eliminated a humoral one seemed inescapable, and imaginations quickly turned to the possibility of the elaboration of pressor substances within the kidney. As far back as 1898 Tigerstedt and Bergman²⁵ had described a protein substance with a marked pressor action extractable from the renal cortex, which they named "renin." Forty years later, independently, but in quick succession, Landis, Montgomery and Sparkman,²⁶ Williams, Harrison and Mason²⁷ and Corcoran and Page²⁸ renewed these experiments and have obtained extracts with similar properties from the renal cortex. Since extracts of a great variety of tissues are known frequently to have depressor and occasionally pressor effects, the demonstration by Landis et al.²⁶ that this substance raises blood pressure without lowering skin temperature in contrast to all previously known pressor substances possibly extractable from tissues, such as adrenaline, pitressin, tyramine and so forth, is of fundamental importance. Confirmatory evidence that renin action is different from that of other pressor substances has been

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obtained by demonstrating the ineffectiveness of cocaine and other drugs either in increasing or decreasing its action.²⁹ Helmer and Page³⁰⁻³ have developed a method for producing renin in large amounts, and have been able to purify it and to show that renin itself in Ringer's solution has no pressor effect, but by interaction with a component of the blood serum (rather unfortunately called "renin activator") forms a third product designated angiotonin which appears to be the actual vasoconstrictive and pressor substance. Renin, they believe, is probably an enzyme since it is a protein, is thermolabile, reacts slowly with its substrate (renin activator) and is effective in small amounts in proportion to the substrate. Moreover, the renin angiotonin relation is a double one, since renin not only forms angiotonin but will with further contact destroy it. Whether or not the pressor effect of the presence of ischemic renal tissue in the body is dependent on an intact endocrine system is still somewhat uncertain. Hypophysectomy probably diminishes but does not abolish its effect.³¹ Bilateral adrenalectomy was found to abolish it, but the effect was cortical rather than medullary and the results with cortin and sodium substitution therapy have been variable.³²⁻³⁶

The application of this wealth of experimental data to human lesions is still far from clear. Excluding rare cases of chromaffin tumors of the adrenal medulla, it is doubtful if anyone to date has succeeded in isolating from the blood of hypertensive patients an effective pressor substance.³¹ Even in dogs the results are equivocal. Houssay and Fasciolo³⁷ report immediate elevation of the blood pressure following transplantation of an ischemic kidney into the neck of a nephrectomized dog, whereas the transplantation of a normal kidney had no such effect. Williams and Grossman³⁸ claim to have obtained renin and an adrenalin-like substance from the renal vein following perfusion of the isolated kidney. Yet Collins and Hoffbauer³⁹ were unable to demonstrate increased pressor action in blood from the renal vein of a hypertensive dog. Direct proof that renin formation and absorption are increased in the hypertensive individual, either human or canine, is still lacking. Tempting as the hypothesis is, it would be foolish at the present time to give it blind credence.

Moritz and Oldt,⁴⁰ reviewing the field of arteriolar sclerosis and hypertension, with advantage over previous investigators of following rather than preceding Goldblatt, have reported statistical data of great interest, based on a very careful comparison of 100 hypertensive with 100 non-

hypertensive individuals. Arteriolar sclerosis may of course be widespread throughout the body in both groups. In all organs and tissues but one the distribution was essentially similar in each, though naturally more severe and extensive in the hypertensive group. In the kidney, however, almost all hypertensive cases (97 per cent) showed renal arteriolar sclerosis in some degree, whereas in the control group only 12 per cent showed even mild arteriolar changes and only 2 per cent changes of moderate severity. These figures approximate closely those of previous investigators. The parallelism between hypertension and obliterative disease of the small renal vessels is impressive though not absolute. No comparable correlation could be found in the case of any other organ or tissue. The anatomical basis for renal ischemia was therefore present in the vast majority of the hypertensive patients and absent in an almost equal proportion of non-hypertensive patients. Even in the 3 cases of hypertension without arteriolar disease the possibility of renal ischemia existed, since severe atherosclerosis of the major vessels including the renal arteries and their main branches was present. It must be pointed out, however, that except in the case of major obliterative lesions the appearance of a vessel post mortem is not an altogether reliable index of its capacity during life.^{41, 42}

It is interesting in this connection that in Goldblatt's dogs the renal arterioles beyond the clamps do not undergo degeneration, whereas elsewhere in the body where the vessels are exposed to the increased intravascular tension arteriolar changes are widespread. Goldblatt has answered beyond doubt one question: prolonged hypertension will produce in the vessels exposed to it degenerative changes of types characteristic of human arteriolar lesions. By varying the degree of ischemia he could, in fact, vary at will the histologic reactions and produce either the hyalinization of benign sclerosis or the proliferative and necrotizing types of arteriolitis that have been widely considered to be typical of malignant hypertension. The latter appeared in his experience, only in animals in which the ischemia was so great that renal insufficiency developed. His findings give strong support to those who consider benign and malignant hypertension merely opposite poles of a single disease entity, as against those who consider them to be similar but pathogenetically different disorders.

Of great interest is the observation of Moritz and Oldt⁴⁰ that in 4 cases the arteriolar degeneration was limited to one kidney. The analogy to the Goldblatt kidney is arresting. Of very similar import is the description by Butler⁴³ of cases of

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histologic picture of the nodes is fairly specific, with irregular 'star-shaped' abscesses, bordered by a zone of epithelioid cells and occasional giant cells. Plasma cells are apt to be very numerous in the remaining nodal tissue. Not infrequently the pathologist has been the first to suggest the correct diagnosis in cases which have been submitted to biopsy.

In women the course is quite different. Presumably because of primary involvement of a deeper lymphatic chain, inguinal node enlargement is rare. In contrast, hypertrophic or ulcerative elephantiasis of the labia or other portions of the pudenda (esthiomene) and inflammatory stricture of the rectum are the characteristic lesions. Any one of the three features or any combination can, however, occur in either sex. In contrast to the relative specificity of the histologic picture in the lymphadenitis, it is rare that anything but a non-specific reaction is reported in esthiomene or the rectal lesions. Marked plasma-cell infiltration is somewhat suggestive.

It was the development of the Frei test that first permitted the recognition of these three widely different clinical syndromes as manifestations of a single disease. Subsequently the virus has been repeatedly recovered and identified from cases of each type. The Frei test remains our most valuable diagnostic method. Antigen prepared from infected mouse brains has proved highly specific and more readily standardizable than human antigen, despite certain claims²¹ to the contrary. In competent hands a specificity and reliability approximating 95 per cent have been obtained.

Evidence is gradually accumulating that the disease does not necessarily remain localized. In the early stages generalized symptoms are frequent, and it is still uncertain to what extent they represent diffusion of the virus and to what extent they are systemic reactions to a localized infection. Of the latter type are probably the skin manifestations, both erythema multiforme and erythema nodosum, and the arthritides. Direct infection of the fallopian tubes has been reported by Schenken²² who has also recovered the virus from the brain of a human patient with symptoms of meningitis. Colonic lesions have been reported, and I have personally seen an isolated lesion of the sigmoid.

Certain observations of considerable interest have been recorded by Gsell.²³ In chronic cases, serum protein determinations frequently show a significant elevation (over 9 gm per 100 cc. in approximately half the cases), a rise caused almost wholly by elevation of the globulins. As would be expected under such circumstances, the formol

gel and Takata-Ara reactions are frequently positive. In a single bone marrow aspiration Gsell found so many plasma cells that a diagnosis of multiple myeloma was temporarily considered.

Finally, it is becoming increasingly apparent as recognition of the disease becomes more general and the Frei test is more extensively applied that the disease is world wide in distribution and much commoner than has generally been realized. Whether or not it is increasing cannot as yet be determined. Of its significant frequency in New England the reports of Howard and Strauss²⁴ and of Chapman and Hayden²⁵ bear witness.

CATARRHAL JAUNDICE

Interest in catarrhal jaundice has always been great in Scandinavia. It was Flindt,²⁶ an obscure Danish physician, who first challenged Virchow's hypothesis of a plug of mucoid inflammatory exudate in the common duct, and offered evidence that the disease was a specific infection and that the basic lesion was a diffuse hepatic degeneration. Forgotten for thirty years, it was rediscovered by Linstedt²⁷ and confirmed by Wallgren.²⁸ Since patients with catarrhal jaundice die only in the rare event that atrophy supervenes, knowledge of the early lesions has been derived from occasional biopsies of the liver usually consequent to a mistake in clinical diagnosis. Roholm and Iversen²⁹ have added considerably to this by a series of thirty-eight aspiration biopsies on 26 patients, obtained at intervals from the third to the fifty first day of the disease. In all cases they found poorly defined foci of liver-cell degeneration and necrosis, an inflammatory reaction predominantly mononuclear in character and varying proliferation of connective tissue—periportal, central and diffusely throughout the lobule. Though as a rule the hepatitis ran its course without leaving any other trace than a slight increase in connective tissue, in 3 cases the latter was marked enough to suggest cirrhosis. In 1 case, indistinguishable in its early stages from the others, a subacute atrophy developed.

A totally new suggestion as to the etiology of the disease has been offered by Andersen.³⁰ An epidemiological survey showed that in Denmark the incidence was lowest in Copenhagen and greatest in rural districts, particularly certain parts of Jutland where the chief economic activity is the raising of hogs. Hogs in Denmark frequently suffer from jaundice, and a fairly close parallelism was shown between the seasonal variation in the number of jaundiced hogs recorded at the slaughterhouses and the reported cases of human catarrhal jaundice. In a second paper Andersen³¹ re-

ports the appearance of jaundice in young pigs a few days after feeding them oil obtained by duodenal drainage from patients with catarrhal jaundice. The experiments still await confirmation. Perhaps it will appear with poetic justice from Germany, if an epidemic of catarrhal jaundice should follow the reported confiscation of the Danish hogs.

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., Editor

CASE 26221

PRESENTATION OF CASE

A twenty-two-year-old white man was admitted to the hospital complaining of pain in the neck for five months.

Approximately five months before admission the patient began noticing sharp, shooting pains in the neck, usually occurring when he stooped for ward. These pains had apparently followed a gradually increasing stiffness of the neck which had progressed for two months before the pains appeared. He attributed these symptoms to a "cold" which had settled in his neck. Motion of the head and pressure over the cervical spine aggravated the discomfort. On one occasion with such movement, his neck snapped, and he became aware of acute pain so that he was forced to remain in bed to keep the head and neck at rest. A local physician who examined him diagnosed his ailment as arthritis. Two weeks later, because of a progression of symptoms, he was taken to an outside hospital where roentgenograms of the cervical spine were said to have shown "decay and destruction" of the cervical vertebrae. A plaster collar was applied, and he wore this constantly with complete relief of pain.

Two months before entry the right knee became painful, the pain radiating upward to the mid-thigh and perineum. The sacral and coccygeal regions, the right hip and the ilium became similarly painful a few weeks later.

Five weeks before admission he noticed beginning constipation, which progressed to obstipation so that he on one occasion failed to have a bowel movement for ten days. Anorexia, a gradual weight loss of some thirty five pounds, and weakness continued to increase apace. For some four weeks before admission his food had consisted entirely of fluids, and apparently as a result of this large fluid intake, polyuria and nocturia appeared. Furthermore he noticed increasing nervousness, sweating and palpitation. There was no gross hematuria or passage of urinary stones. At no time had he noted redness, swelling or local heat over the painful areas of the neck, knee and pelvic regions. There were no chills, fever, headache or vomiting. Because of the obvious grav-

ity of his illness, he was admitted to this hospital for further diagnosis and treatment.

The remaining family, marital and past histories were non-contributory.

Physical examination revealed an extremely emaciated but well-developed male who lay quietly in bed in some distress. His neck was held in a bivalved cast. On its removal nothing unusual was observed in the neck region save slight non-localized cervical vertebral stiffness and tenderness. The heart and lungs were normal. The blood pressure was 165 systolic, 110 diastolic. There was tenderness in the right flank and right costovertebral angle, without rigidity or palpable mass. The reflexes were depressed. There was no muscle fibrillation, but there was great generalized muscular atrophy. The remainder of the examination was negative.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red-cell count of 2,680,000, with 60 per cent hemoglobin, a hematocrit reading of 30 per cent, a color index of 1.12, a mean corpuscular volume of 115 cubic microns, a mean corpuscular hemoglobin of 34.2 micro-micrograms and a mean corpuscular hemoglobin concentration of 3.15 per cent. The white-cell count was 8450, with 64 per cent polymorphonuclears, 26 per cent lymphocytes, 3 per cent monocytes, 1 per cent basophils and 1 per cent eosinophils. The urine examination was negative, save that the Sulkowitch test for calcinuria was positive, there was no proteinuria. The blood Hinton test was negative. The serum calcium was 18.0 mg per 100 cc, the serum phosphorus 3.6 mg, the serum phosphatase 14.2 units and the serum protein 7.8 gm. The basal metabolic rate was + 16 per cent.

Roentgenograms of the bones of the pelvis, scapulas, mandible and visible portions of both femurs, as well as the sacrum were riddled with defects which varied in size from half to several centimeters in diameter. Similar changes were seen in several ribs, in the first and second lumbar vertebrae and in the fourth cervical vertebra. There was a compressed fracture of the last, as well as one of the second lumbar vertebra. In several places where the disease involved flat bones—in the pubic bones and in the ribs—there was expansion of the involved bones. The bones which were not involved showed fairly normal density. The lamina dura around the teeth, so far as could be seen in the skull films, was preserved. The wing of the ilium showed particularly marked involvement and was almost completely destroyed. Further x-ray studies, including intravenous py-

elography, were either negative or not dissimilar from those previously noted

The patient ran a slowly progressive, downhill course. On the tenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR WYMAN RICHARDSON I shall ask the x-ray consultant four specific questions. First, in regard to the pyelogram, is the dye concentrated sufficiently to suggest a fair renal function?

DR AUBREY O HAMPTON I should say that, if the patient were prepared for an intravenous pyelogram,—that is, if he were dehydrated before the dye was given,—there is something wrong with his kidneys which is probably functional. I cannot be sure of the type.

DR RICHARDSON Can you say anything about the size and shape of the kidneys?

DR HAMPTON I cannot see the kidney outlines due to the quality of the film, but the kidney pelvis on the right side is not dilated. The left kidney pelvis is not visible.

DR RICHARDSON Is there any calcium in the kidney or calcium stones elsewhere?

DR HAMPTON I have to take the report for that. This film was taken after the dye. Here on another film is a fairly dense kidney pelvis. Perhaps the kidney function was not so bad as I supposed on the first film. It seems to have been fairly normal, at least in one kidney.

DR RICHARDSON My last question is in regard to uninvolved bone. I should like again to have you say,—if it is so,—that the uninvolved bone is relatively normal.

DR HAMPTON I should say that the bone between the areas of destruction is entirely normal. The numerous punched-out areas of bone destruction produce an astonishing picture particularly in a man of his age. This film provoked a lot of "ah's" in the x-ray department when left on the illuminator. It shows a very extensive, purely destructive process in the bone of a young man. The disease did extend below the elbow at this point in the radius. The skull film is not here, but the lesions there were smaller but sharp and round, similar to this. These lesions in the pelvis are unusually large.

DR RICHARDSON I am no expert on bone disease or calcium metabolism. I shall probably make many mistakes which Dr Albright will immediately correct. I suspect this hook is baited with a choice morsel of parathyroid adenoma, but I am not biting for that. I do not see how it could be, for several reasons. In the first place, the phos-

phorus level is normal. Although one may get a normal or elevated phosphorus level in hyperparathyroidism, one has to presuppose then, I think, difficulty with renal function. I am going to speak of renal function later, but for the moment I shall assume that it was normal. In the second place, the phosphatase is distinctly elevated. It is my impression that, when hyperparathyroidism involves a large amount of bone, the phosphatase becomes greatly elevated. If it does not involve bone it will not be elevated at all. This process involves a tremendous amount of bone, and therefore one would expect with hyperparathyroidism an even higher phosphatase level. In the third place, it is difficult to see how a disease produced by overactivity of the parathyroid glands would produce localized lesions with normal bone elsewhere. Finally, the clinical course, which is rapidly downhill, suggests cancer rather than hyperparathyroidism, which in those cases I have seen has usually been a very much more chronic process.

Could it be secondary hyperparathyroidism? In certain cases of renal failure, there does occur, I believe, hyperplasia of the parathyroid glands. One explanation of this might be a retention of phosphorus because of damaged kidneys, with a resulting tendency to reduction of the blood calcium and an attempt on the part of the parathyroid glands to overcome this. That may be a silly explanation.

Is there any evidence of damaged renal function in this case? The patient shows clinical hypertension. The urine is reported as normal. If so, we are entitled to believe the specific gravity was above 1.020. No blood nonprotein nitrogen is reported—probably it is just as well. At least we have evidence that dye was excreted, although it may not have been excreted quite so well as normal. So on the whole it seems to me that we have very little evidence of renal failure. There may be a little. That may account for the phosphorus level as given here.

One other point—he had a macrocytic normochromic anemia. This is not uncommonly seen in uremia, but may also be seen in cancerous involvement of bone. In itself one cannot take that as evidence of renal failure. Therefore, I feel that it must be cancer. If so, what is it?

I shall rule out multiple myeloma on the basis of the patient's age. It is unusual to see myeloma in a patient this young. Otherwise it could be myeloma, it seems to me, there is no positive evidence of it, however. The serum protein was normal, and there was no Bence-Jones protein in the urine, though of course the latter does not have

to be present. No plasma cells were noted in the blood smear. Ordinary metastatic carcinoma from the thyroid gland, prostate or breast would seem very unlikely in this young man, therefore I shall rule that out. Also, the prostatic metastases to bone that I have seen have always shown a certain amount of osteoplastic activity, that is, increased density in the lesion. This lesion, as Dr Hampton pointed out, is almost purely osteolytic.

The next problem is lymphoma. Lymphoma not infrequently involves bone, but I have never heard of such extensive involvement as this—in my experience, two or three discrete lesions are the rule.

Finally, there is the question of renal carcinoma or hypernephroma. This seems to me the most likely diagnosis. There are one or two more points to be brought out about such a diagnosis. In the first place, could widespread malignant metastases to bone produce a blood calcium of 18 mg per 100 cc, a concentration which is very close to the lethal level? I do not know. I say it could because it apparently did. How could it? Obviously there was a terrific destruction of bone, and I suppose the calcium had to go somewhere. Another thing we notice is that he had constipation. We might even suspect—I do not know whether this can be proved—that calcium was not being excreted in the bowel in normal fashion and could not all get out through the kidney. I do not believe that I have to assume that this patient had hyperparathyroidism either primary or secondary to explain the high serum calcium. However, whatever the explanation of the serum calcium its high level seems to explain most of this patient's symptoms.

What positive evidence have we of renal carcinoma or hypernephroma? The only evidence is pain and tenderness in the right costovertebral angle and right flank. Possibly the obstruction may have had something to do with pressure in the region of the ascending colon. I think it is probably better to explain the constipation and obstruction on the basis of lack of food intake—starvation, in other words. The polyuria and polydipsia I assume are explained better as an attempt to excrete calcium than they are on any other basis. The nervousness, sweating, palpitation and muscular weakness could be due to a high blood-calcium level. Can high blood pressure be associated with it? I do not know. I might have looked up a number of these things, but I thought it would not be cricket to do that, so I have done the best I could with what I know. My diagnosis is renal carcinoma or hypernephroma.

DR. TRACY B. MALLORY: Are there any questions or comments?

DR. WILLIAM B. BREED: I think it is fair to say that everyone who saw him failed to make a diagnosis until the bone marrow was examined.

DR. BERNARD M. JACOBSON: The most important laboratory finding in ruling out multiple myeloma is the phosphatase. It does not help in the differential diagnosis, when elevated, between metastatic carcinoma and hyperparathyroidism. The last I heard about the case was that at quarter past nine this morning the pathologists were still working on the diagnosis. The sternal marrow cells, which I called something or other which I had never seen before, resembled lymphoblasts.

CLINICAL DIAGNOSIS

Lymphoblastic lymphoma.

DR. RICHARDSON'S DIAGNOSIS

Renal carcinoma or hypernephroma, with metastases to bone.

ANATOMICAL DIAGNOSES

Lymphoblastic lymphoma

Bronchopneumonia, slight.

Congenital anomaly—horseshoe kidney

PATHOLOGICAL DISCUSSION

DR. MALLORY: Dr. Jacobson did a sternal puncture and the findings were later confirmed by a sternal biopsy. In the sternal puncture he found that erythropoiesis and myelopoiesis were markedly decreased. Nearly 90 per cent of the cells present were somewhat large, round cells, with very scanty bluish cytoplasm and a nucleus which was considered consistent with that of a lymphoblast. At the end of the autopsy I have nothing to add to that. I think we must consider this a lymphoblastic type of malignant lymphoma—lymphoblastic myeloma, if one wishes to call it that. The autopsy showed very extensive destruction of the bones, with numerous spontaneous fractures, including compressed fractures of two or three vertebrae. There was virtually no involvement outside of the skeletal system that one could recognize in gross. One kidney was horseshoe shaped, so it is not surprising that the outlines were difficult to make out. Its surface showed many poorly defined, mottled, grayish areas. On microscopic examination there were multiple foci of tumor cells scattered throughout the cortex. The spleen showed small numbers of scattered tumor cells but was not significantly enlarged. The liver showed very extensive hematopoiesis, evidently compensation for the great destruction of marrow.

CASE 26222

PRESENTATION OF CASE

A thirty-nine-year-old unmarried woman was admitted to the hospital complaining of pain and stiffness of the left knee

Approximately six months before admission the patient "spontaneously" developed stiffness of the left knee. This progressed and became painful. Pain was then present constantly and was aggravated by change of position after rest. There was only slight pain during actual weight bearing, but with walking and motion, however, the joint became swollen and required the use of an Ace bandage. She found that the application of ice packs relieved the pain, but that it was markedly aggravated by heat. She was acutely aware of weather change. Gradually the knee changed in shape. The patient lost 17 pounds in weight (from 112 to 95 pounds), was anorexic and stated that everything she ate produced "gas." Throughout the illness she continued to work as a boxmaker in a factory. There were no other symptoms, save easy fatigability and a constant feeling of lassitude. One month before admission she had had an attack of dysuria, frequency and slight gross hematuria, which lasted two weeks and then cleared spontaneously. Since that time she had remained asymptomatic.

At the age of eighteen she had had a pelvic operation resulting in an artificial menopause. The remaining family and past histories were non-contributory.

Physical examination, which revealed a pale, thin, undernourished woman, was essentially negative. She walked with a slight limp, and the left knee was held in flexion at 15° . There was a slight valgus deformity of the knee. The leg, just below the joint, was definitely enlarged, forming a mass that was more noticeable laterally. The veins over the enlargement were engorged. The mass was smooth in contour, firm, and definitely warmer than were the adjacent tissues. There appeared to be slight thickening of the joint capsule with no increase in joint fluid, and the area was tender to palpation both medially and anterolaterally. The head of the fibula was normal to palpation. Measurements of the legs were within normal limits, although 2.5 cm below the patella the left leg measured 30 cm in circumference, and the right 28.8 cm. The motion of the left knee was limited to flexion from 15° to 120° , while the right ranged from 0° to 140° .

The temperature, pulse and respirations were normal.

Examination of the blood showed a red-cell count of 4,000,000 with a hemoglobin of 75 per cent, and a white-cell count of 6500 with 61 per cent polymorphonuclears. Examinations of the urine were negative. The serum calcium was 10.8 mg per 100 cc, the serum phosphorus 2.5 mg, the serum phosphatase 10.3 units and the serum protein 7.6 gm. The blood Hinton and Wassermann tests were positive.

Roentgenograms of the left knee showed that the proximal 6 cm of the left tibia close to the joint surface was markedly increased in density, the trabeculation being only incompletely visible. The increase in density was apparently produced by thickening of the cortical bone as well as by changes deeper in the bone. The bone surface was irregular in several places, without spicule formation. The appearance of the bone in these areas was more or less lacelike. No soft tissue mass was seen, but there was some slight swelling of the soft tissues along the medial aspect of the upper portion of the tibia. This extended upward to the level of the femoral condyle. Films of the skull and chest were negative. A gastrointestinal series was negative.

On the seventh hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR ROY E. MABREY: There are a few points that I should like to mention before we see the x-ray films. The duration of the disease—six months—is not of any help in making the diagnosis. The fact that the patient lost 17 pounds in weight may have been due to the pain she had in the leg, with consequent loss of sleep and appetite. She had easy fatigability and lassitude, which again might be non-specific responses to pain and loss of weight. She had dysuria and slight gross hematuria, both of which bring up an interesting possibility. The urine itself was negative, however, at the time she was admitted. No intravenous pyelogram was done, just a flat plate of the abdomen being taken. The operation that produced an artificial menopause probably does not have any bearing on the matter. The fact that she had no increase in joint fluid would tend to indicate that this was probably not an inflammatory condition, however, that does not always hold. The white count was 6500. The other tests were normal, except for the phosphatase, which was definitely elevated. She had a gastrointestinal series, demonstrating that some interest was taken in the anorexia and the belching of gas, and the results appear to rule out any primary lesion in the stomach.

May we see the x ray films?

DR. AUBREY O HAMPTON I cannot add anything to the note. The periosteal proliferation which produced the irregularity described is interesting I know the answer so I cannot go any farther

DR. MABREY The problem seems to be to differentiate inflammation and a neoplasm. Acute osteomyelitis we can rule out on the duration, the absence of fever and the white count. She might have had a low-grade form, a so-called Brodie's abscess, which could last for so long a period, but in view of the extent of the lesion I think she would have had something more in the way of elevated temperature and white count. A new entity, osteoid osteoma has been recently described. These lesions are quite small, however and do not reach the size of this one.

The next possibility is tuberculosis. That may occur around the joints. The skin of this patient was not white, as it is in tuberculosis the blood vessels were engorged, and the skin was warm to touch. So I feel that I can rule out tuberculosis.

She had positive Hinton and Wassermann tests so we must very seriously consider syphilis. The pain in syphilis of the bone is usually nocturnal although that is not always the case. With such a lesion we should expect a moth-eaten appearance, however, the lesion in this case is apparently one of a sclerosing type. The phosphatase in inflammatory lesions is usually normal, so that we have that evidence against its being syphilis.

When we come down to the neoplastic diseases there are a number we have to consider briefly. This episode of dysuria, with frequency and gross hematuria, brings up the question of whether she might have had osteitis fibrosa cystica. She could have had a parathyroid tumor with stones in the kidneys, but the laboratory tests rule it out. It is true the phosphatase was elevated but the lesion is single and we should expect it to be multiple. We can safely rule that out. Giant-cell tumor would not give this appearance by x ray, it is usually limited to the epiphyseal area. It is possible that it might have undergone malignant degeneration, however, and, if so, could have produced such a picture as this. This tumor does not extend up to the joint surface. You can see trabeculation of the bone up to the cartilage which would not be true of giant-cell tumor. With that much degeneration the tumor would extend up to the cartilage and not leave any bone there. Reticulum-cell sarcoma we should not have to consider seriously. Usually the patients are older than this. Such a lesion is very extensive, with

out causing marked constitutional reaction. We see patients with large lesions, and yet the general condition is very good. The question of metastatic carcinoma we have to consider again, and the urinary symptoms and the finding of blood in the urine at one time might suggest a hypernephroma that had metastasized to the bone. Of course such a tumor could metastasize to any area, however, no other foci were found. The stomach was investigated, presumably because cancer of the stomach sometimes metastasizes to bone. The thyroid gland and breasts were apparently normal in this patient. The serum phosphatase may be elevated in metastatic carcinoma, although in a single lesion it is usually not increased.

Another primary tumor we have to consider is Ewing's tumor. This case has none of the characteristics—no elevation of temperature, no increase in white count and no characteristic x ray film. As you know, with Ewing's tumor you see a lamination which gives the so-called onion peel appearance, and there is none of that here.

We come finally to osteogenic sarcoma. The duration of the story is consistent with that of an osteogenic sarcoma. The x ray picture is not typical because we usually consider that spicule formation is characteristic of this disease. There is involvement of both the cortex and the medulla of the bone. However, that is in favor of osteogenic sarcoma. The phosphatase is markedly increased, a finding that is consistent with osteogenic. It seems we come to three considerations: syphilis, metastatic carcinoma and osteogenic sarcoma. With the material at hand I favor osteogenic sarcoma.

DR. FULLER ALBRIGHT There are one or two interesting points that came up. In the first place, the crux of the matter is all in the phosphatase. With syphilis you only get bone formation and bone destruction in a small area, and not a high phosphatase. A high phosphatase would rule out a small lesion and would indicate osteogenic sarcoma or Paget's disease. Since it was not Paget's disease, I thought it was osteogenic sarcoma. I was sufficiently skeptical, however to insist that another phosphatase be done, it turned out to be 5 units.

CLINICAL DIAGNOSIS

Bone tumor?

DR. MABREY'S DIAGNOSIS

Osteogenic sarcoma

ANATOMICAL DIAGNOSIS

Bone syphilis

PATHOLOGICAL DISCUSSION

DR TRACY B MALLORY As Dr Albright has intimated, this did turn out to be syphilis. The clinical service refused to commit itself to any definite preoperative diagnosis, and the patient was operated on for biopsy. Frozen sections of the material removed at operation showed an inflammatory process, with no evidence of neoplasm, and the wound was closed after removing a few pieces of bone and of the surrounding soft tissues. In the final sections it was evident that we were dealing with a granulomatous type of infection. The predominant cell in the infiltrate was the plasma cell, and there were focal clusters of monocytes in tubercle-like groups, which are quite consistent with miliary gummas. There was absolutely no necrosis or destruction of bone, which would certainly have been present if the lesion had been tuberculous. After the histological finding and the positive serological tests I think there can be no

doubt that this was a syphilitic lesion. The patient is now under antisyphilitic treatment, and says that she feels very much improved.

DR HAMPTON In the x-ray seminar yesterday this case was shown, and I insisted that it was not osteogenic sarcoma because there was no soft tissue mass. If an osteogenic sarcoma involves that much bone you ought to have a big tumor. The periostitis on the lateral aspect of the tibia is that of a series of blunt hills, instead of ray formation. It is a very dense and well-organized periosteal reaction, indicating a chronic process.

DR WILLIAM B BREED I have been led to believe that the calcium and phosphatase determinations in this hospital are accurate and dependable. Does that hold with the phosphatase or should we be doubtful about them?

DR ALBRIGHT You might justifiably be doubtful about any chemical determination. The phosphatase level occasionally does jump up to 10 units for no reason. I do not know whether it is an inaccurate determination or whether something strange makes it do that.

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A SYMPOSIUM ON MEDICAL CARE

THE School of Law of Duke University is engaged in a program to publish a series of group magazine articles designed to inform the public about matters of public interest in its quarterly periodical, *Law and Contemporary Problems*. Two numbers in this series have been published that are of interest to the medical profession. That of January, 1939, devoted to the administration of the new food, drug and cosmetic legislation, was commented on editorially in the August 31 issue of the *Journal*. The next publication, which appeared last October, is reviewed in this issue of the *Journal*. It includes fourteen articles by prominent lawyers, investigators and students of legislative procedures pertaining to public health, medical practices and the proposed insurance plans relat-

ing thereto which have been under consideration by state legislatures and Congress.

In these articles, especial emphasis is placed on two major trends in the field of medical care. The first consists of a discussion of the development of corporations and associations, sponsored either by medical organizations, by consumer groups or by governmental agencies, all organized to provide hospital service and medical care on a prepayment basis." The second deals with the principles underlying the administration of the plans for grants-in-aid of federal funds to extend state health plans, with particular consideration of the Wagner Bill, not so much however, in advocacy of the proposals but rather to clarify in the minds of the people the composition and functions of these several agencies now being devised for adoption or which may be created later. Although voluminous articles and discussions have been put before the public covering the attitude of the governmental agencies and the plans now in operation or under consideration by state, county and group medical organizations, there is, probably, a considerable proportion of the medical and lay public that has a vague or incomplete knowledge of the complicated problems involved, hence an evaluation of these articles by open-minded students of these subjects is helpful in developing practical solutions of the controversial propositions. Undoubtedly the School of Law of Duke University is engaged in a worthy effort to present evidential facts and the bearing of them on matters of importance before the citizens of this country.

At the present time the nation is being imperturbed by students of health problems to reconstruct its attitude and procedures relating to the prevention and treatment of disease. With this purpose in view, legislation is being devised in a program centered in the Wagner Bill or its successor, now before Congress, and it is pertinent that a non medical body representing a sister profession should present the results of its study of the situation and the proposed measures to be incorporated in this bill.

Most of the articles in the symposium have a

bearing on those sections of the bill and its associated provisions relating to health, and study of these papers will aid in the drafting of the indicated legislation. It is therefore appropriate that the medical profession and the public should unite in the expression of appreciation of the work of the authors of these papers

THE RISK OF BIOPSY

ONE of the deterrents to early and accurate diagnosis of malignant tumors has been the fear, more or less unwarranted, that biopsy might lead to dissemination of the neoplastic cells. On the basis of clinical experience, however, the advantages of accurate knowledge of the nature of a tumor far outweigh theoretical dangers of metastasis. In addition, some data based on observations on animal tumors are available. A curious commentary on our occasionally illogical thought is provided by those who unhesitatingly curette a uterine neoplasm and yet balk at biopsy of a breast tumor.

From any aspect it is better when possible to excise a tumor nodule intact and thus avoid the potential spreading of tumor cells. When this is not possible, various means of obtaining tissue have been proposed, such as aspiration biopsy. Aspiration biopsy is not so favorable for diagnosis as methods giving more adequate tissue, but is relatively simple.

The dangers of incisional biopsy have probably been exaggerated. A recent important contribution on this subject has been made by Paterson and Nuttall,* who followed a group of patients with epidermoid carcinomas of the skin and mucous membranes of the mouth which were treated by radiation. Early lesions, without clinical evidence of involvement of the lymph nodes, had biopsy specimens removed by sharp ring forceps, no electrocoagulation was used, and the portions of tissue removed were large. All cases were treated essentially alike and seen in the regular

follow-up clinic of the hospital, 202 cases were initially included in the study but certain ones were discarded because they did not entirely meet the criteria. Finally 99 cases with biopsy and 67 cases without biopsy were studied from the standpoint of metastasis, 19 per cent of the biopsied cases showed metastasis, and 20 per cent of the non-biopsied cases.

This careful piece of work demonstrates that in carcinoma of the skin and mucous membranes biopsy does not increase the likelihood of metastasis. It is probable that a similar study of carcinomas of the breast or of the rectum would have a similar result.

MEDICAL EPONYM

BUCK'S EXTENSION

The extension apparatus which bears Gurdon Buck's (1807-1877) name was first described by him before the New York Academy of Medicine at a meeting held on March 20, 1861. A report of the paper was given by Dr. George F. Shrady in the *Bulletin of the New York Academy of Medicine* (1:181-188, 1861).

A roller bandage is commenced at the toes in the usual way, and continued to the ankles, where it is temporarily arrested. A band of adhesive plaster two and a half to three inches broad, and long enough to allow the middle of it to form a loop below the sole of the foot, and the ends to extend above the condyles of the femur, is then applied on either side, in immediate contact with the limb, from the ankle upwards. Over this the bandage is continued as high up as the plaster. A thin block of wood of the width of the plaster, and long enough to prevent pressure over the ankle, is inserted into the loop, and serves for the attachment of the extending cord, which is fastened to an elastic rubber band (such as is used for door springs), that passes round the block.

The limb is now prepared to be put under extension. A strip of inch board three inches wide is fastened upright to the foot of the bedstead, and perforated at the height of four or five inches above the level of the mattress. Through this hole the extending cord is to be passed, and on the further side of the strap a screw pulley should be inserted at the proper level over which the cord, with the weight attached, is to play. Coaptation splints should be secured by elastic bands. Counterextension must be maintained by the usual perineum band lengthened out in the direction of the long axis of the body, and fastened to the head of the bedstead.

R. W. B.

*Paterson R. and Nuttall J. R. An evaluation of the risk of biopsy in squamous carcinoma. *Am J Cancer* 37:64-68, 1939.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS
AND GYNECOLOGY*

RAYMOND S. TITUS, M.D. *Secretary*
330 Dartmouth Street
Boston

PYELITIS OF PREGNANCY

Mrs. C. C., a thirty-eight year-old primipara, four months pregnant, was admitted to the hospital on September 6, 1935, with chills, fever, malaise, nausea and vomiting. She gave a history of having had these symptoms for two months.

The family history was negative. The patient's past history was essentially negative. Catamenia began at thirteen, were regular with a twenty-eight-day cycle, and lasted five days. The last period was April 20, making the expected date of delivery January 27, 1936.

Physical examination showed a well-developed and well-nourished woman. The heart was not enlarged, there were no murmurs. The lungs were clear and resonant, there were no rales. The uterus was enlarged to a size consistent with the period of amenorrhea, and a uterine fibroid was evident on palpation. The urinary sediment showed large numbers of white blood cells in clumps, there were no red cells and no casts. A urine culture showed *Bacillus coli*. Blood examination showed the hemoglobin to be 80 per cent, the red-cell count 3,870,000, and the white-cell count 8600. A blood culture taken on September 7 showed *Staphylococcus albus*.

On September 9 the hemoglobin was 80 per cent, the red-cell count 3,800,000, and the white cell count 10,500. She was transfused with 300 cc. of citrated blood.

The temperature rose steadily until it reached a peak of 103.6°F on the fifth day then gradually dropped until it reached normal on the tenth day.

On September 15 the patient was cystoscoped. The infected right renal pelvis was irrigated with boric acid solution, the catheter being left in place for twenty-four hours. The patient was discharged on September 29, asymptomatic.

The patient was carried to term with some difficulty, her general health being poor. She was admitted to the hospital at term on January 27, 1936. At that time her urine still showed many white cells but there were no definite kidney complaints. The delivery was uneventful, as was the postpartum course.

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

Comment This case illustrates the modern treatment of pyelitis with kidney lavage and with catheter drainage for twenty-four hours, cultures of the blood and urine having been taken. Transfusions in small amounts are often very beneficial to patients who become run-down and anemic from pyelitis, and the small transfusion in this case was done for its tonic effect rather than because of severe anemia as at the time the hemoglobin was 80 per cent and the red-cell count almost 4,000,000. No subsequent attack of pyelitis occurred before delivery.

DEATHS

HARDING — GEORGE F. HARDING, M.D., of Brookline, died May 16. He was in his seventy-ninth year.

Born in Dorchester, he attended Harvard University and received his degree from Harvard Medical School in 1889. He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, two sisters and a brother survive him.

KENNELLY — JULIA G. KENNELLY, M.D., of Cambridge, died February 9. She was in her seventy-second year.

Dr. Kennelly received her degree from the Woman's Medical College of Pennsylvania in 1900. She was a former member of the Massachusetts Medical Society, and had retired from active practice.

SHATTUCK — ALBERT M. SHATTUCK, M.D. of Worcester, died May 26. He was in his seventy-first year.

Born in Groton, he received his degree from the Dartmouth Medical School in 1895. He was on the staff of the Worcester City Hospital and the Memorial Hospital, Worcester for many years. Dr. Shattuck was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow and a son survive him.

STILES — FRED M. STILES, M.D., of Waltham, died recently. He was in his seventy-seventh year.

Born in Westbrook, Maine, he received his degree from Bowdoin Medical School in 1890 and did postgraduate work at Harvard Medical School.

Dr. Stiles was a member of the Massachusetts Medical Society and the American Medical Association.

His daughter survives him.

SWEENEY — JOHN G. SWEENEY, M.D., of Hingham, died May 16. He was in his forty-sixth year.

He received his degree from Tufts College Medical School in 1916. Dr. Sweeney was former medical examiner for the Plymouth District and a former member of the Massachusetts Medical Society.

MISCELLANY

NEW CHARITY TO CORRECT
SPEECH DEFECTS

A Massachusetts charter has just been granted the Institute for Speech Correction Incorporated, organized without capital stock to give the most up-to-date instruction in overcoming stammering, lipping and other speech defects exactly at cost. This new corporation has taken

over the Boston Stammerers' Institute, which was the oldest school of its kind in America

Arrangements have been made with Emerson College whereby adequately supervised advanced students in speech pathology will instruct without charge any pupil at the institute who, on recommendation of his family physician, cannot pay for his lessons

The following public spirited educators, psychiatrists and business men have been elected trustees and are giving their services without compensation Harry S. Ross, president of Emerson College, Frederick C. Packard, Jr., associate professor of public speaking, Harvard University, Dr. Edgar C. Yerbury, director of the Division of Mental Hygiene, Massachusetts Department of Mental Health, Joel W. Eastman, attorney, John M. Taylor, banker, Seth T. Gano, bank director and trustee, Dr. Douglas A. Thom, professor of psychiatry, Tufts College Medical School, and Payson Smith, LL.D., lecturer at Harvard University Graduate School of Education.

Samuel D. Robbins, permanent secretary of the American Speech Correction Association and professor of psychology at Emerson College, has been elected managing trustee. Mr. Robbins was for twenty-five years director of the Boston Stammerers' Institute, which was founded in 1867

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MARCH, 1940

| DISEASES | MARCH 1940 | MARCH 1939 | FIVE YEAR AVERAGE* |
|--------------------------|---------------|---------------|-----------------------|
| Anterior poliomyelitis | 1 | 0 | 0 |
| Chickenpox | 1471 | 1181 | 1376 |
| Diphtheria | 9 | 14 | 19 |
| Dog bite | 732 | 754 | 738 |
| Dysentery bacillary | 36 | 24 | 6 |
| German measles | 56 | 105 | 1248 |
| Gonorrhea | 308 | 384 | 461 |
| Lobar pneumonia | 609 | 900 | 723 |
| Measles | 1487 | 4290 | 3034 |
| Meningococcus meningitis | 3 | 5 | 19 |
| Mumps | 866 | 1015 | 1260 |
| Paratyphoid B fever | 11 | 1 | 2 |
| Scarlet fever | 607 | 895 | 1233 |
| Syphilis | 501 | 416 | 551 |
| Tuberculosis pulmonary | 242 | 315 | 296 |
| Tuberculosis other forms | 20 | 28 | 38 |
| Typhoid fever | 3 | 4 | 5 |
| Undulant fever | 5 | 3 | 3 |
| Whooping cough | 644 | 970 | 946 |

*Based on figures for preceding five years

RARE DISEASES

Anterior poliomyelitis was reported from Boston, 1, total, 1

Diphtheria was reported from Abington, 1, Boston, 3, Chelsea, 1, Fall River, 1, Monson, 1, Waltham, 1, Wrentham, 1, total, 9

Dysentery, bacillary, was reported from Amherst, 2, Attleboro, 1, Belchertown, 24, Beverly, 1, Boston, 1, Malden, 1, Marblehead, 1, Northampton, 1, Norwood, 1, Sterling, 3, total, 36

Infectious encephalitis was reported from Melrose, 1, Webster, 1, total, 2

Leprosy was reported from Medford, 1, total, 1

Meningococcus meningitis was reported from Chelsea, 1, Hadley, 1, Wilmington, 1, total, 3

Paratyphoid B fever was reported from Arlington, 1, Boston, 1, Brookline, 2, Marblehead, 1, Milton, 1, Revere, 2, Salem, 1, Wakefield, 1, Worcester, 1, total, 11

Pfeiffer bacillus meningitis was reported from Dracut, 1, Mills, 1, total, 2

Septic sore throat was reported from Boston, 10, Box-

ford, 3, Cambridge, 6, Fall River, 3, Lexington, 1, Malden, 1, Medford, 3, New Bedford, 1, Sturbridge, 2, Water town, 1, Webster, 1, Whitman, 1, total, 33

Tetanus was reported from Boston, 1, total, 1

Trachoma was reported from Boston, 2, total, 2

Trichinosis was reported from Boston, 1, Lynn, 3, total, 4

Typhoid fever was reported from Lynn, 1, North Andover, 1, Somerville, 1, total, 3

Undulant fever was reported from Boston, 1, Greenfield, 1, Springfield, 1, Wayland, 1, Williamstown, 1, total, 5

The reported incidences of chickenpox and undulant fever were slightly above the five-year averages.

Paratyphoid B fever had its highest March incidence since 1934

Bacillary dysentery, primarily of the Sonne type, continues to be prevalent, although at a slightly lower level than that of last month

Diphtheria, German measles, measles, mumps and lobar pneumonia were reported well within the five year averages

The reported incidences of anterior poliomyelitis, dog bite, gonorrhea, syphilis and whooping cough were at expected levels

There was nothing remarkable in the reported incidences of tuberculosis, typhoid fever and scarlet fever

NOTES

The appointment of Dr. Walter L. Mendenhall, professor of pharmacology at Boston University School of Medicine, to the advisory board of the *United States Pharmacopoeia* was recently announced.

The appointment of Dr. William T. Green as director of the After-Care Clinic of the Harvard Infantile Paralysis Commission was recently announced at Harvard University. He was appointed assistant professor of orthopedic surgery this spring at Harvard Medical School, and since 1934 has been a member of the staff of Harvard Medical School and of the Children's Hospital, Boston.

The members of the commission are Dr. John E. Gordon, chairman, and Drs. Kenneth D. Blackfan, C. Sidney Burwell, Cecil K. Drinker, Frank R. Ober, Alton S. Pope, George B. Wislocki and Hans Zinsser.

REPORTS OF MEETINGS

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on February 13, with Dr. Elliott C. Cutler presiding.

The first case presented was that of a forty-one year-old man who entered the hospital complaining of progressive weakness and pains shooting down the backs of both legs. One year prior to admission he had successfully passed an insurance examination. One month before entry he had noted a slight upper-respiratory infection, and this was followed by a typical attack of lobar pneumonia with hemoptysis and a temperature of 103°F, successfully treated with sulfapyridine. He never seemed to recover and began noting weakness and shooting leg pains. Physical examination was negative except for tenderness of the left hip and both gastrocnemii and pain on flexion of the left hip. Routine laboratory studies were normal. A flat plate of the abdomen revealed destructive lesions in the

bony pelvis and lumbar spine and subsequent roentgenograms showed a lesion diagnosed as primary carcinoma of the lung. Pain was essentially unrelieved by x-ray therapy.

In discussing the case Dr. Merrill C. Sosman reminded the audience of the frequency with which pulmonary carcinoma has its first manifestations in its metastases and is ushered in by one or more attacks of pneumonia.

The surgical case was that of a thirty-nine year-old man who was brought to the hospital in a semicomatose state after allegedly being struck and injured by an automobile. The patient entered with multiple contusions and abrasions. The temperature was 101 F., the pulse 140 and the respirations 20. He was found by x-ray study to have a compound, comminuted fracture of the left lower leg which was debrided under spinal anesthesia. Gas-bacillus antitoxin was administered. Lumbar puncture revealed a bloody fluid, but the patient was not subjected to x-ray studies of the skull. His course in the hospital was one of gradual mental clearing and general improvement. Dr. Cutler congratulated the house staff on refraining from taking x-ray films of the skull, for he considered the condition of the brain more important than that of its casing. He also reminded the audience that accidents in the home are the only ones more frequent than those caused by the ubiquitous automobile.

The speaker of the evening was Dr. Alan R. Moritz, professor of legal medicine at the Harvard Medical School, whose subject was "The Application of Medical Science to the Administration of Justice." He pointed out that despite the existence in European universities of departments of legal medicine for fifty to one hundred years, the recent establishment of such a unit at Harvard Medical School was the first of its kind on this continent. Dr. Moritz criticized our coroner system, inherited from England, because of the uncertain political tenure of the coroner who is not even required to have professional qualifications. A non-political medical examiner's system is much better.

To emphasize the importance of a qualified professional physician as medical examiner Dr. Moritz referred to typical incidents where competent judgment was necessary. In regard to homicide, the time of death may be important, even if only approximate; this can be estimated in numerous ways. The circumstances of death may be ascertained by the configuration of fracture lines, by the path of a bullet or by the gastric contents.

An interesting study in New York City has shown that 40 per cent of adult pedestrians killed by automobiles were under the influence of alcohol. This was considered important collateral information in placing blame in such cases. The same investigation revealed that almost 50 per cent of fatal assaults occurred in persons whose alcoholic content in the brain was at such a level that it was likely to predispose to quarreling. Frequently knowledge of this character constituted valuable evidence in assessing the degree of guilt of an accused person.

Dr. Moritz stressed the importance of investigating cases of sudden death even though there is no evidence of unnatural causation. Many such cases are found at autopsy to have resulted from unsuspected physical or chemical injuries. Similarly the finding of numerous cases of poisoning recently in Philadelphia and Cincinnati has confirmed the feeling that an untold number of such unsuspected unnatural deaths probably occur in this country and pass unnoticed in those communities not supplied with a competent medical-examiner system.

Another phase of death wherein such a system clarifies matters is that which concerns those who die of natural

causes but with external signs of violence. Dr. Moritz alluded to the fact that there are many people walking about, driving cars and frequenting places where unexpected collapse is almost sure to result in violent injury. The latter has often been the death-certificate diagnosis when there was either no autopsy or only a superficial one, whereas the true cause of death might well have been a coronary thrombosis. The speaker cited as an illustration the unfortunate husband who was sentenced to prison for homicide because he slapped his wife's face shortly before she was stricken with a cerebral embolus arising from a diseased heart. Actually about five of every one hundred deaths thought clinically to be due to violence, are found at autopsy to have resulted from natural causes.

Dr. Moritz also referred to the great loss to vital statistics each year because of incomplete investigation of cases of sudden or unexpected death. Many deaths from diseases such as tuberculosis, syphilis, poliomyelitis, meningitis, pneumonia, and so forth escape recognition.

Methods at the disposal of the scientific investigator of crime were discussed briefly by the speaker. Among the important chemical studies are the recognition of alcohol in the tissues and the diverse methods of running down "story-book" clues. The latter were held to be of practical importance in many cases. Microscopy also plays a role in this regard but Dr. Moritz suggested that it is probably more important to know where to get expert assistance than it is to attempt to maintain a complete consulting staff in each laboratory.

In regard to the problem of medical testimony in court the speaker warned of the dangers of expecting a judge or jury to be able to choose competently between the testimony of partisan rivals in psychiatric cases. He advocated instead the appointment by the court of a nonpartisan medical expert for all such problems. Dr. Moritz also criticized a too strict adherence to the doctrine of protection against self-incrimination. By improperly employing this defense, a lawyer may refuse to allow routine physical examination or urinalysis, as well as more elaborate tests on clothing, hair and so forth of his client.

NOTICES

ANNOUNCEMENT

THOMAS J. CAVANAUGH, M.D., announces the opening of an office at 270 Commonwealth Avenue Boston

REMOVAL

H. S. QUEEN, M.D., announces the removal of his office to Hotel Brandon Hall, 1501 Beacon Street, Brookline.

NEW ENGLAND HEALTH EDUCATION ASSOCIATION

The annual conference of the New England Health Education Association will be held Friday and Saturday June 7 and 8 at the Massachusetts Institute of Technology in Cambridge.

The conference will open Friday afternoon with inspection of the exhibits and a social hour followed by the annual business meeting at 5:30 p.m. The guest speaker at the dinner (6:30 p.m.) will be Helen S. Mitchell, Ph.D., research professor of nutrition at the Massachusetts State College in Amherst. Her subject will be, "Food Facts and Fallacies."

On Saturday morning Samuel Prescott, Ph.D., will give the address of welcome. Henry Otto, Ph.D., consultant

in education of the W K Kellogg Foundation, Battle Creek, Michigan, will speak on "Health Education and Its Relation to Public Health and Medical Care." Other speakers will be Miss Helen Almy, director of social service at the Massachusetts Eye and Ear Infirmary, who will speak on "A Medical-Social Approach to a National Health Program," and Dr Allan M. Butler, of Boston, who will speak on "The Need for Conservatism in the Provision of Budgeted Medical Services"

The conference will close with a luncheon Miss Mabel C Bragg, Boston University, will be the speaker Miss Mabel M Brown, president of the association, will preside.

HARVARD MEDICAL ALUMNI ASSOCIATION

The annual meeting and dinner of the Harvard Medical Alumni Association will take place on Wednesday, June 12, at 7 15 p.m. at the Harvard Club of New York during the annual session of the American Medical Association. The speakers will be President James B Conant and Drs C Sidney Burwell, Lincoln Davis and Cornelius P Rhoads

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held in the classroom of the nurses' residence on Thursday evening, June 6, at 7 15 p.m. The program will consist of case presentations of cardiac disease, maternity deaths and diarrhea with the autopsy results

1940 GRADUATE FORTNIGHT

The 1940 Graduate Fortnight of the New York Academy of Medicine will be held from October 14 to 25. The purpose of this meeting is to make a complete study and authoritative presentation of a subject of outstanding importance in the practice of medicine and surgery. The current topic is "Infections."

There will be a carefully integrated program, which will include morning panel discussions, afternoon clinics and clinical demonstrations at many of the hospitals of New York City, evening addresses and appropriate exhibits. The evening sessions of the Academy will be addressed by recognized authorities in their special fields, drawn from leading medical centers of the United States. The comprehensive exhibit will include books and roentgenograms, pathologic and research material, and clinical and laboratory diagnostic and therapeutic methods. It is also planned to provide demonstrations of exhibits.

The following subjects will be included: experimental basis of chemotherapy in the treatment of bacterial infections, clinical bacterial chemotherapy, results obtained and dangers encountered, a general consideration of bacterial infections, recent advances in knowledge of streptococcal infections, infections of the mouth, pharynx and upper respiratory tract, infections of the middle ear and nasal sinuses, infections of the teeth and surrounding structures, influenza, pneumococcal infections, bacterial meningitis, infections of the urinary tract, gonococcal infections in the male, gonococcal infections in the female, osteomyelitis and pyogenic infections of the joints, wound infections, puerperal infections, treatment of infections by methods other than chemotherapy, virus infections, acute poliomyelitis, brucellosis—undulant fever, rickettsial diseases, lymphogranuloma venereum, epidemic encephalitis, other forms of encephalitis and choriomeningitis, and exanthematous diseases.

litis, other forms of encephalitis and choriomeningitis, and exanthematous diseases

The Academy provides this program for the fundamental purpose of medical education, consequently all members of the medical profession are eligible for registration. A complete program and registration blank may be secured by addressing Dr Mahlon Ashford, New York Academy of Medicine, 2 East 103d Street, New York City

CHILDREN'S MEMORIAL HOSPITAL, MONTREAL

The Annual Postgraduate Course which has been given for the past three years at the Children's Memorial Hospital, Montreal, will not be held this year. It is not the intention of the hospital to discontinue the course, but rather to postpone it, due to the war and to an extensive building program. As soon as conditions permit, the course will be resumed with improved facilities.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, JUNE 2

THURSDAY JUNE 6

7 15 p.m. Clinical conference and meeting of staff New England Hospital for Women and Children.

FRIDAY JUNE 7

New England Health Education Association Massachusetts Institute of Technology, Cambridge

SATURDAY JUNE 8

New England Health Education Association Massachusetts Institute of Technology, Cambridge.

JUNE 4-6—National Gastroenterological Association Page 737 issue of April 25

JUNE 4-7—American Association of Industrial Physicians and Surgeons Page 654 issue of April 11

JUNE 7-8—American Heart Association Page 469 issue of March 14.

JUNE 7-10—American Board of Obstetrics and Gynecology Page 613 issue of April 4

JUNE 8—Dedication of Osier Memorial Page 862 issue of May 16.

JUNE 8 and 10—American Board of Ophthalmology Page 719 issue of November 2

JUNE 8-10—American College of Chest Physicians Page 781 issue of May 2.

JUNE 10—American Medical Golfing Association Page 824 issue of May 9

JUNE 10-11—American Neisserian Medical Society Page 898 issue of May 23

JUNE 10-14—American Medical Association. Annual meeting New York City

JUNE 10-14—American Physicians Art Association Page 332 issue of February 22

JUNE 12—Harvard Medical Alumni Association Notice above.

JUNE 12—New England Obstetrical and Gynecological Society Page 613 issue of May 23

JUNE 12—Jefferson Medical College Alumni Association Page 893 issue of May 23

JUNE 23-25—Maine Medical Association Annual meeting Bangor Lakes

JUNE 25-27—Medical Library Association Page 862 issue of May 16.

JUNE 27—Pentucket Association of Physicians The Try Angle, Greenland

SEPTEMBER 2-6—American Congress of Physical Therapy Page 851 issue of May 16

OCTOBER 8-11—American Public Health Association Page 655 issue of April 11

OCTOBER 11-12—Pan American Congress of Ophthalmology Page 613 issue of May 23

OCTOBER 14-25—1940 Graduate Fortnight of the New York Academy of Medicine. Notice above.

OCTOBER 21—American Board of Internal Medicine Inc. Page 332 issue of February 29

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

JULY 31

OCTOBER 30

BOOKS RECEIVED FOR REVIEW

The Early Diagnosis of the Acute Abdomen Zachary Cope. Eighth edition. 257 pp. London and New York: Oxford University Press 1940. \$3.75

A Text-Book of Psychiatry for Students and Practitioners D. K. Henderson and R. D. Gillespie. Fifth edition. 660 pp. London and New York: Oxford University Press, 1940. \$6.00

Immune-Blood Therapy of Tuberculosis With special references to latent and masked tuberculosis Joseph Holke. 197 pp. Boston: Bruce Humphries, Inc., 1938. \$2.50

Psychiatric Clinics for Children With special reference to state programs Helen L. Witter. 437 pp. New York: The Commonwealth Fund, 1940. \$2.50.

Clinical Parasitology Charles F. Craig and Ernest C. Faust. Second edition. 772 pp. Philadelphia: Lea & Febiger 1940. \$8.50

Diagnosis and Treatment of Head Injuries Sidney W. Gross and William Ehrlich. 275 pp. New York: Paul B. Hoeber Inc., 1940. \$5.00.

Minor Surgery Frederick Christopher. Fourth edition. 990 pp. Philadelphia and London: W. B. Saunders Co., 1940. \$10.00.

The Complete Pediatrician Practical diagnostic therapeutic preventive pediatrics Wilbur C. Davison. Third edition. 256 pp. Durham: Duke University Press, 1940. \$3.75

Electrocardiography Chauncey C. Maher and Paul H. Wozak. Third edition. 334 pp. Baltimore: Williams & Wilkins Co., 1940. \$4.00

Obesity and Leanness Hugo R. Rony. 300 pp. Philadelphia: Lea & Febiger, 1940. \$3.75

The Foot and Ankle Their injuries diseases deformities and disabilities Philip Lewin. 620 pp. Philadelphia: Lea & Febiger 1940. \$9.00.

A Manual of the Common Contagious Diseases Philip M. Samson. Third edition. 465 pp. Philadelphia: Lea & Febiger 1940. \$4.00.

BOOK REVIEWS

Medical Care Vol. VI No. 4 *Law and Contemporary Problems* 182 pp. Durham, North Carolina: Duke University School of Law, 1939. 75 cents.

This volume, the Autumn, 1939 issue of *Law and Contemporary Problems* contains fourteen articles, contributed by men all holding scientific or professional degrees. Each of these contributions is worthy of elaborate analysis but space is not available for more than a discursive review with the hope that sufficient interest will be aroused for their more detailed study.

The first article, by I. S. Falk, member of the Interdepartmental Technical Committee on Medical Care, gives the historical background of the awakened and progressive interest in the socioeconomic proposals set forth in the subsequent chapters. His contribution is an informative and logical disquisition concerning the facts and experiences which have influenced earlier workers in the fields of public health and economics pertaining to medicine.

The second, by Martin W. Brown, general secretary Bureau of Co-operative Medicine, carries the theme of the first through the history of some experimental organizations. He describes the economic and varying problems of medical care which have arisen because of the advances in the application of scientific knowledge, the development of medical institutions and the growth of specialties leading to the operation of eight groups engaged in furnishing medical care, thereby showing the differences in the fundamentals that prevail in the experiments which have

been made to determine the success of such organizations.

Joseph Laufer, editor-in-chief of the *Duke Bar Association Journal* in the third article discusses that type of medical care which is classified as contract practice and which includes the intermediate offices of a third party, individual or organization who or which contracts with physicians individually or collectively for service to a group of patients. He includes a history of group and contract practice and of the operation of these organizations, which, in certain instances, ran counter to the ethical principles adopted by the American Medical Association.

The fourth article under the caption "Enabling Legislation for Non-Profit Hospital Service Plans" is by C. Rufus Rorem, the director of the Commission on Hospital Service of the American Hospital Association. After showing that hospitalization is one of the unpredictable and expensive forms of health service which together with other incidental expenses constitutes an economic hazard that can be logically avoided by resort to insurance, the author explains the attitude of the states in dealing with the problems raised by insurance methods to spread the costs of medical care. This has required the study of state laws which vary widely as shown in decisions by state insurance departments where the ruling has been that hospital-service insurance necessitates special enabling acts. That this plan for enabling acts is not a simple solution of the problem is shown by the many essential details of administration.

Maunce J. Norby, research director of the Council on Hospital Service Plans of the American Hospital Association continues the discussion of hospital-service plans including their contract provisions and administrative procedures, in the fifth article. He describes hospital service as a form of protection which means collective co-operation in the equalization of losses resulting from the uncertainty of health but states that it is not health insurance since it provides for only one form of health service through a corporation. He then proceeds to define the different forms of contracts and the subscriber's relations thereto. In this scheme, group enrollment is essential for apparent reasons. This article is a continuation and amplification of the facts and theories and the details of operation set forth in the preceding chapter and should be studied with the other.

The sixth article, presented by William J. Burns, executive secretary of the Michigan State Medical Society deals with the medical-service problems of Michigan culminating in the passage of the first group-medical-care enabling act on the statute books of a large industrial state, which was the result of the combined efforts of the state government, the state medical society and the state department of insurance. Payments for the benefits provided in the act include private corporations, association groups, individuals and the governmental agencies (in behalf of indigents). Each contract is with the subscriber patient so that no third party comes between the patient and physicians. This act has served in many particulars as a model for others.

Another illustration of a non-profit medical-service corporation is presented by Hartley F. Peart, president of the Bar Association of San Francisco and Howard Hassard, member of the California Bar in the seventh chapter. The managerial functions in this plan are carried by a board of trustees and the service is conducted by California physicians who are paid by the so-called unit system which distributes the accumulated pool funds among the participating physicians. Full beneficiary memberships are applicable to those whose family incomes do not exceed \$3000 a year but families in the higher brackets are eligible for benefits on payment of additional fees to the doctor.

The eighth article is under the title of "The Medical-Care Program for Farm-Security-Administration Borrowers," by R. C. Williams, who began his career as a practitioner of medicine and after three years entered public-health service and now is chief medical officer of the Farm Security Administration, and deals with 100,000 low-income farm families that are borrowers from this administration. The service became necessary because of the economic distress of 3,000,000 farm families in more than twenty states. The illness problem of this large group, which is both a cause and a result of poverty, involved the necessity of devising plans which would ensure medical care at rates bearing relation to the financial situation and the co-operation of physicians in the adjustment of fees. State medical associations co-operated in the plans adopted in conformity with principles promulgated by the American Medical Association. All the administrative details are set forth in this article and cover the various forms of service.

The ninth chapter deals with the "Anti-Trust Prosecutions against the American Medical Association," contributed by Benjamin D. Raub, Jr., the current-decisions editor of the *Duke Bar Association Journal*. This article gives a description of the organization of the Group Health Association, Incorporated, of Washington, District of Columbia, a non profit co-operative organization for the purpose of furnishing medical care and hospitalization to its members and their dependents on a risk-sharing prepayment basis. It is a voluntary association with membership originally limited to employees of the Home Owner's Loan Corporation, with the further explanation that the only connection between the federal government and the Group Health Association was a grant of \$40,000 by the Home Owners Loan Corporation, made because of the opinion that the Group Health Association would reduce the loss of employees' services through illness. Congress discussed the propriety of this grant but took no action. Later the Group Health Association voted to include as eligible for membership all civilian employees of the executive branch of the government and voted to assess themselves to create a fund for repayment of the grant of the Home Owners' Loan Corporation.

The Medical Society of the District of Columbia initiated a policy of opposition to the Group Health Association. The legality of the association was questioned in suits brought by the insurance commissioner of the District of Columbia on the ground that it was engaged in the insurance business and by the United States district attorney on the ground that it was a corporation engaged in the practice of medicine. The court held that neither of these allegations was correct. Then followed suits against the American Medical Association, the Medical Society of the District of Columbia, the Harris County Medical Society of Texas and certain individuals for alleged violation of Section 3 of the Sherman Act, which declares it a misdemeanor to "engage in any combination or conspiracy in restraint of trade in the District of Columbia."

A summary of the indictment is to the effect that the defendants conspired to restrain the Group Health Association in its business of arranging for the provision of medical care and hospitalization to its members and their dependents, to restrain its members in obtaining by co-operative efforts adequate medical care for themselves and their dependents from doctors engaged in group-medical practice, to restrain doctors serving on its medical staff, to restrain other doctors in the District of Columbia in the pursuit of their callings, and to restrain the Washington hospitals in the operation of their business

The defendants demurred to the indictment. Judge Proctor of the District Court of the District of Columbia decided in favor of the defendants, sustaining the demurrer. The government petitioned the Supreme Court of the United States for a writ of certiorari which, if granted, would permit appeal to the Supreme Court, this was denied. The rest of the article is devoted to a review of the legal questions raised by the demurrer, as submitted by both sides, and is a voluminous digest of the purposes and meaning of the language of the Sherman Act.

This is an important precedent which may have repercussions in future cases, because it seems to be established that medical societies, organized legally and with rules relating to membership or behavior of members that are not found to be illegal, may find that other organizations engaged in furnishing medical care may not meet the approval of the local medical society.

The tenth chapter is devoted to the "Background of the Wagner National Health Bill," by Harold Maslow, formerly staff member of the Committee on Research in Medical Economics. This bill is based on earlier experiences, studies, conferences and enactments relating to or brought about by socioeconomic conditions.

The Act passed in 1918 provided federal grants to state venereal disease programs. Other bills for grants-in-aid followed, but many health problems received little legislative encouragement until the passing, in 1921, of the Sheppard-Towner Bill, which provided grants to states for infant and maternal hygiene. In 1934 President Roosevelt appointed a committee to draft a social security bill which provided for federal grants for public health and infant and maternal hygiene, these were amplified in 1939 under the social security provisions of the Wagner Bill.

After the passage of the Social Security Act, the President appointed an Interdepartmental Committee to coordinate health and welfare activities. This committee in turn appointed the Technical Committee on Medical Care to continue studies of the 1934 committee. These committees submitted two reports in 1938,—"The Need for a National Health Program" and "A National Health Program,"—which were submitted to Congress and designed to interest the people in the extension of medical services according to a ten-year program, with the result that, in 1938, representatives of the professions, labor, farmers and civic bodies were invited and came to the National Health Conference.

Since that time there has been a tendency to endorse the propaganda of unmet health needs and focus public discussion on plans for meeting such deficiencies. The reports of these committees were presented to Congress with the result that the Wagner Bill was introduced. Extensive hearings on the bill were conducted with farmers, labor interests and some physicians in favor and the American Medical Association in opposition. In August 1939, the subcommittee reported agreement with the general purposes and objectives of the bill, with recommendation for further study.

The provisions of the Wagner Bill, which is, in substance, a series of amendments to the Social Security Act with some new features, are fully discussed. In this account there is abundant opportunity for the student to speculate on the questions which naturally arise when individuals engage in propaganda concerning complicated economic or sociological problems in which health plays a prominent part. Sympathy for human suffering and political expediency may perhaps point in one direction with the possibility of

another by a mind swayed by emotion rather than logic. It is certainly true that when questions of relief from human suffering are to be considered, those people who are trained to deal with ill health are best qualified to solve many of these problems and should be recognized rather than those who see political advantage in large expenditure of public funds; hence it is reasonable to expect that in dealing with health matters every opportunity for co-operation by the medical profession should be cordially encouraged. The Wagner Bill has been a source of controversy which might have been avoided if in its earlier stages, cordial relations with the medical profession had been established.

The eleventh chapter deals with "Public Medical Services also under Title VIII of the National Health Bill," the author being David F. Cavers, professor of law Duke University who shows that the implications in the bill indicate that under its provisions there is the possibility of the enactment of compulsory health insurance in addition to uncontroversial projects. He goes on to show that since the depression the burdens imposed by illness and indigency have been too heavy for the support of tax payers, hospitals, physicians and very many charitable agencies. In order to meet these conditions, the Emergency Relief Administration was devised, and in 1934 twenty nine states were receiving assistance from this organization but even so the situation was not satisfactory, according to a report of the Committee on Medical Care of the American Public Welfare Association in 1938.

The twelfth chapter presents "Legislative Proposals for Compulsory Health Insurance," by Louis S. Reed, chief of the Medical Economics Section Health Studies Division Bureau of Research and Statistics, Social Security Board. In connection with studies of the desirability of legislative action, he submits the drafts of three state bills in addition to a model bill composed by the American Association for Social Security which was drawn in co-operation with leading authorities. The first had been drawn up in California by the Governor's Committee on Health Insurance the second had been introduced in the New York Assembly the third had been considered in the Wisconsin Assembly in 1937 a few changes having been made by Mr. Andrew Biemiller. Not one had been enacted up to the writing of this chapter. These four bills are designed to provide adequate medical care and spread the burden of illness costs and all exclude from compulsory coverage the self-employed and two exclude farm and domestic service workers. All, except the California bill, limit compulsory coverage to manual workers and non manual employees earning less than \$3000 a year.

The fundamental principles here set forth are very much like those in old-age insurance, and questions arise as to the limits of health insurance to incomes, in so far as the medical service in the low-income groups may not equal that provided for the well-to-do and the complications incident to administration of these laws.

The thirteenth chapter by I. S. Falk, L. S. Reed and B. S. Sanders, the last being chief of the District of Columbia Bar covers the "Formulation of Disability Insurance." They show that because of the effects of the depression the United States is following the trend in other nations toward social insurance which in wider scope, will lessen the insecurity due to loss of earnings through unemployment, as already provided in certain provisions by the federal government and forty seven states. In the Wagner Bill, under Title XIV, a proposal is submitted for a federal-state system of temporary disability insurance, and this, with proposed amendments in H. R. 6635 seems

to be a pattern for the development of an amplified form of social insurance. The need for this seems indicated by the amount of dependency traceable to disabling illness and by the wage losses due to disabling illness as shown by opinions founded on fact finding studies indicating that thirty five per cent to fifty per cent of poverty asking for relief is due to sickness. Statistics in this article are submitted in confirmation of these facts.

As the argument proceeds from explanation of the underlying causes and varieties of disabilities, all the complicating factors are discussed in extenso and the varieties of relief indicated are defined in the conclusion reached that disability and invalidity insurance will necessitate a sharing of the costs by employers and employees and further that large expenditures by federal state and local governments are warranted because the security now provided is inadequate.

The last chapter by Clarence Heer professor of economics at the University of North Carolina is devoted to a study of the formula for grants-in-aid and of the Wagner Bill which is officially entitled the National Health Act of 1939. This is "primarily a grant-in-aid measure" with detailed specifications covering conditions under which the several states may if so desired receive funds from the federal government to assist them in specified health services under their own devised and administered plans. It provides an appropriation of \$98,000,000 of federal money during the first year of operation of which \$89,000,000 will be paid to the states as grants-in-aid, with the understanding that such grants will depend on the states raising matching funds. If state co-operation is forthcoming "it is estimated that some ten years hence, when the program reaches its maximum federal grants for various public services, for medical care to the needy and for the construction and maintenance of hospitals but excluding grants for state sickness-insurance claims, will reach a total of \$425,000,000 per annum." With matching state appropriations, the sum will be \$850,000,000 and will represent a net addition to the \$571,000,000 of federal state and local funds which according to estimates, are now being spent on public health services and hospital care in the United States.

Anyone interested in the published facts and conclusions which have appeared in the last decade pertaining to the sociological problems of health and to the laws designed to broaden the scope of measure dealing with them will find in these papers a résumé of facts and opinions which have a bearing on the changing attitude of the public toward medicine. There is, however a rift to be bridged before the ethical principles of the profession will be generally interpreted and adopted by the public this will be accomplished only when there shall have been brought about a more general appreciation of the devotion of the profession to human needs. Now that the legal fraternity has shown its interest in the accomplishments of medicine there should follow an enthusiastic endorsement of the aims and purposes of organized medicine.

Sclerosing Therapy The injection treatment of hernia hydrocele varicose veins and hemorrhoids Edited by Frank C. Yeomans. 337 pp. Baltimore. Williams & Wilkins Co. 1939 \$6.00.

In this book, treatment by the injection of sclerosing fluids into hernias, hydroceles, varicose veins and hemorrhoids is considered. The last two topics, presented by Shelley and Yeomans respectively are clear well illustrated and conservative expositions which can be read with profit by those interested.

As Hoch points out in the second article, the surgical

treatment of hydrocele is accompanied by a rather high incidence of wound complications. Injection treatment, which is well described, should therefore have much to offer, but one is disappointed to find no statistical analysis of the results or complications of the method.

The same criticism can be made, to a considerable extent, of the first and longest article in the book. In it, Bratrud carefully reviews the subject of the injection treatment of hernia from the point of view of ten years' experience as director of the clinic for ambulant treatment of hernia of the University of Minnesota Medical School. Indications, contraindications and technics are well described and illustrated, but in the chapter on results one finds only very scanty data on the duration of cure. The most careful, and discouraging, study of end results that has thus far appeared, that of Burdick and Coley from the Hospital for the Ruptured and Crippled of New York City, is dismissed in a sentence.

It seems to the reviewer that the author of this section, in common with all protagonists of the injection method of treating hernia, bases his work on the false assumption that scar tissue will not stretch. If such were the case infected abdominal wounds healing by secondary intention should never herniate, but unfortunately they do with considerable frequency. However, for those few individuals who refuse operation or for whom operation is contraindicated, the method is worthy of trial.

For the surgeon who is called on to employ sclerosing therapy the book can be highly recommended.

The Physiological Basis of Medical Practice. A University of Toronto text in applied physiology. Charles H. Best and Norman B. Taylor. Second edition. 1872 pp. Baltimore: Williams & Wilkins Co., 1939. \$10.00.

The first edition of this book was issued in 1937 and at once became the standard and most popular book of its day, linking together the preclinical subject of physiology and that of medical practice. A large book, full of material, it has become a bible of the junior clinician, for it bridges his medical school work with actual contact with patients in the clinic or hospital. Accurately written, extensively documented and widely supplied with charts and diagrams, it is not surprising that this book has been reprinted four times before a second edition was called for two years after the first was issued.

In this new edition, the material has been carefully revised, and a new section on the special senses added. In order to save space, which is an important consideration in a book of its size, the titles of papers have been omitted from references, unless necessary for the identification of the paper. There is an extensive bibliography by chapters at the end of the book, listing not only the important papers on the subject but also monographs and reviews. In addition, the book is thoroughly indexed. As a reference book, this volume is outstanding.

Health in Handcuffs. John A. Kingsbury. 210 pp. New York: Modern Age Books, Inc., 1939. 75c.

This book, written by the former executive officer of the Milbank Fund, is published for the purpose of showing that health administration and the resources of scientific medicine are not operating to capacity because of several inhibiting factors. After an appreciative tribute to the medical profession and other agencies included in dealing with the problems of illness and the economic complications incident thereto, the author explains the complexities involved in the adjustment of the resources of this nation to the prevailing sociologic conditions and expresses his belief that health insurance in one form or another will

play an important part in dealing with them. Endorsement of the principle underlying group practice and adequate hospitalization of a larger proportion of the population are among other propositions advanced.

The major trend of the belief of Mr. Kingsbury, however, is in the advisability of the passage of the health program as set forth in the Wagner Act and to this end a large proportion of his arguments is directed. This has brought him into conflict with the attitude of the American Medical Association, which he assails in the spirit of a crusader.

The book is well written and contains much information covering the propositions of federal bureaus and departments with respect to the health program defined in the bill before Congress.

Bergey's Manual of Determinative Bacteriology. A key for the identification of organisms of the class schizomycetes. David H. Bergey, Robert S. Breed, E. G. D. Murray and A. Parker Hitchens. Fifth edition. 1032 pp. Baltimore: Williams & Wilkins Co., 1939. \$10.00.

The practicing bacteriologist cannot but feel that he owes a debt of gratitude to those of his colleagues who have been willing to keep this now well-established manual up to date. To review it properly would require a detailed study which the present reviewer has not been able to give. In the past he has found occasional errors in this book or, let us say, points in which his opinion differed from that of the original author. But these were never important and did not diminish the great importance of the manual as a reference book for all bacteriological laboratories.

The task of the present authors has been rendered particularly difficult by the changes in bacterial classification which have resulted from the newer knowledge of dissocation. They are aware of this, however, and the reviewer agrees with them that none of this work has necessitated fundamental changes in a systematic classification of this kind. The bacteriologist who, like the reviewer, is engaged in the study of purely pathogenic bacteria is quite incompetent to judge the book as a whole. But in those sections with which he is familiar he finds this new edition as valuable as he has found preceding ones. The nomenclature is a bit confusing to the "old hand," who has difficulty in recognizing some of his old friends under new names. And he is apt to wonder why such first cousins—almost twins—as the gonococcus and meningococcus which, unless the source is known, are not easy to tell apart, are separated in different families seventeen pages apart. But these and similar examples are all points in which legitimate differences of opinion are possible and do not detract from the great value of this book which performs a difficult and necessary service.

Lane Medical Lectures. Viruses and Virus Diseases. Thomas M. Rivers. 133 pp. Stanford University, California: Stanford University Press, 1939. \$2.50.

Dr. Rivers, director of the Hospital of the Rockefeller Institute for Medical Research, has had published in book form the Lane Medical Lectures, given by him in 1938. The subject is highly technical but of great interest to physicians who are keeping up with progress in bacteriology. Dr. Rivers discusses lymphocytic choriomeningitis, the pathology of virus diseases, immunologic and serologic phenomena of virus diseases, and their treatment and prevention. The work summarizes the latest advances in this field of medicine and, as such, is an invaluable addition to medical literature.

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BLOOD-PHOSPHORUS STUDIES IN RHEUMATIC FEVER*

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SEVERAL years ago it was noted that many children hospitalized with acute rheumatic fever had been attending our outpatient clinic for months before the appearance of symptoms definitely attributable to their disease. During this period the presenting signs and symptoms were chronic fatigue and failure to gain weight. The occurrence of chronic undernutrition prior to the onset of the symptoms of rheumatic fever stimulated closer analysis of this factor. In the group of patients studied, signs of malnutrition were common. This was attributed to diets inadequate in proteins, minerals and vitamins and relatively rich in carbohydrates, maintained over long periods. One of the essential elements which was deficient was phosphorus. The known relatively high requirement of phosphorus for optimal growth and its role in muscle metabolism prompted an investigation of its content in the blood of a small group of patients.

For the determination of phosphorus the method of Tisdall¹ was used in the earlier part of the study, however, 70 per cent of all the analyses were made with the colorimetric method of Fiske and Subbarow.² Analyses were performed on the bloods of 38 patients. The samples were taken before breakfast, and the examinations were started within half an hour of the drawing of the blood. Analyses were made of the inorganic phosphorus and the total phosphorus of the serum, and of the phosphorus in the alcohol-and-ether-soluble and acid-soluble fractions of whole blood. The latter fraction contains inorganic phosphorus, phosphoric esters and undetermined compounds. Finally, the total phosphorus content of the whole blood was determined.

The following is a brief outline of the procedure used. The details may be found elsewhere.^{3, 4}

Half a given sample of blood was placed in a paraffined centrifuge tube and promptly centrifuged. The serum thus obtained was divided into four samples. Trichloroacetic acid was added to one sample, which was then filtered. The protein-free filtrate was analyzed for inorganic phosphorus by adding ammonium molybdate and amino-naphthol sulfonic acid, which produces a color change to blue. After suitable dilution this was compared colorimetrically with a known standard. The other three samples of serum were digested with sulfuric acid. The last stage of the digestion was carried out with superoxal (this contains 0.0005 per cent phosphorus). The clear digest after suitable dilution and addition of ammonium molybdate and amino-naphthol sulfonic acid was compared colorimetrically with standard solutions. This analysis gave the total amount of phosphorus in the blood serum.

The other half of the freshly drawn venous blood was placed in a glass bottle containing a small amount of potassium oxalate. This oxalated whole blood was divided into five samples. Three of these were digested with sulfuric acid for the determination of the phosphorus content of whole blood. The fourth sample was treated with trichloroacetic acid, filtered and analyzed for the acid-soluble fraction. The fifth sample was used for determination of the phosphorus of the alcohol-and-ether-soluble fraction by adding a 3:1 mixture of alcohol and ether bringing to a boil, cooling and filtering. Portions of the filtrate were digested and prepared for the analyses.

The values recorded in Table 1 and Figure 1 represent the averages of three determinations on all blood fractions with the exception of inorganic phosphorus, wherein two determinations were made. The total of the acid-soluble and alcohol-and-ether-soluble fractions approximated the total blood phosphorus and served to check the analyses. The results were compared graphically with average values derived from controls from this clinic and with similar values derived from obtaining the average of a larger control series that included the cases of Stearns and Warweg.^{5, 6} These workers made a complete study of the phosphorus of the blood in a group of 124 children.

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†This study was made possible by a grant from the Charlton Research Fund of Tufts College Medical School.

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The 33 patients from this clinic included 18 who showed clinical and laboratory evidence of rheumatic fever (The blood sedimentation rate was considered to be the most reliable laboratory means of judging activity of the disease) The 15 controls consisted of patients with sinusitis, pyelonephritis, skin lesions or arrested tuberculosis Five

TABLE 1 *Phosphorus Partition in Serum and Whole Blood of Rheumatic Fever Patients and Controls*

| AGE | No OF CASES* | SERUM | | WHOLE BLOOD | | | RED BLOOD CELL COUNT |
|-----|------------------|----------------------|------------------|-------------------------|------------------|------------------|----------------------|
| | | INORGANIC PHOSPHORUS | TOTAL PHOSPHORUS | ACID SOLUBLE PHOSPHORUS | LIPID PHOSPHORUS | TOTAL PHOSPHORUS | |
| yr | | mg per 100 cc | mg per 100 cc | mg per 100 cc | mg per 100 cc | mg per 100 cc | ×10 ³ |
| 5 | 3 R | 4.9 | 10.8 | 23.3 | 9.9 | 34.0 | 4.1 |
| | 1 C ₀ | 4.7 | 13.9 | 25.3 | 13.5 | 39.5 | 4.0 |
| | 5 C ₁ | 5.5 | 15.2 | 28.3 | 12.5 | 41.0 | |
| 6 | 5 R | 5.0 | 10.8 | 23.0 | 11.0 | 34.1 | 4.1 |
| | 2 C ₀ | 4.8 | 14.2 | 28.3 | 11.9 | 39.8 | 4.8 |
| | 4 C ₁ | 5.1 | 14.0 | 27.2 | 12.0 | 39.4 | |
| 7 | 1 R | 4.8 | 12.9 | 24.1 | 8.9 | 33.0 | 4.4 |
| | 3 C ₀ | 5.4 | 13.6 | 26.7 | 11.8 | 39.3 | 4.3 |
| | 3 C ₁ | 5.3 | 14.1 | 28.2 | 12.3 | 40.7 | |
| 8 | 2 C ₀ | 4.9 | 12.8 | 28.1 | 11.6 | 40.2 | 4.3 |
| | 5 C ₁ | 5.1 | 13.7 | 26.2 | 11.7 | 38.1 | |
| 9 | 4 R | 4.3 | 11.2 | 23.5 | 9.7 | 33.7 | 4.4 |
| | 3 C ₀ | 5.5 | 12.2 | 28.0 | 12.3 | 40.7 | 4.3 |
| | 3 C ₁ | 4.9 | 14.6 | 25.7 | 12.0 | 37.8 | |
| 10 | 4 R | 5.2 | 12.7 | 22.1 | 10.2 | 34.6 | 4.6 |
| | 3 C ₀ | 5.1 | 14.6 | 28.1 | 13.0 | 41.3 | 4.7 |
| | 4 C ₁ | 5.9 | 15.9 | 28.1 | 12.2 | 40.5 | |
| 11 | 1 R | 5.5 | 15.0 | 20.7 | 11.8 | 32.6 | 4.3 |
| | 3 C ₀ | 4.7 | 14.2 | 27.0 | 11.4 | 38.7 | 4.4 |
| | 8 C ₁ | 4.9 | 13.4 | 25.1 | 12.0 | 37.1 | |

*R—rheumatic fever patients C₀—Floating Hospital controls C₁—Stearns and Warweg controls

patients from the North Reading State Sanatorium with active tuberculosis were also studied (Table 2) With these exceptions the controls were in the convalescent stages of their respective illnesses

In whole blood as well as in the acid fraction the highest values obtained in the rheumatic series were invariably lower than the minimum control values, including those of the North Reading group The depletion of phosphorus was most marked in the organic fraction The average reduction of phosphorus in the whole blood of the patients with rheumatic fever as compared with the controls was 15 per cent There was a corresponding reduction of the available acid-soluble fraction as well as of the alcohol-and-ether-soluble fraction There was a smaller reduction of about 10 per cent in the available serum phosphorus

DISCUSSION

It is not impossible that the variations from normal in the rheumatic fever group are to be expected as the result of the disease itself, and have little to do with the nutritional state prior to the development of clinical and laboratory signs of rheumatic fever However, an analysis of the

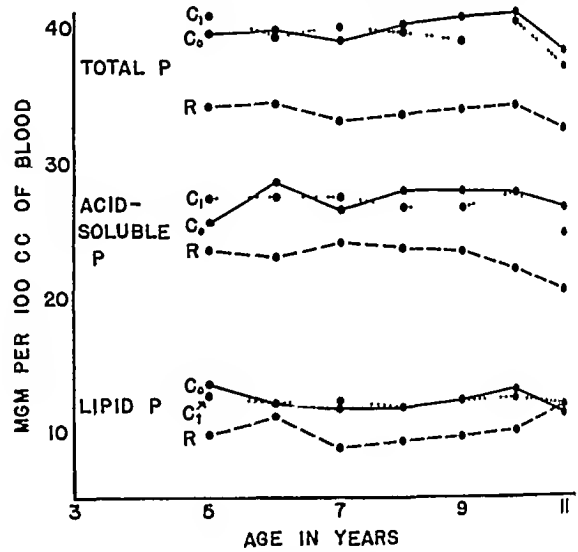


FIGURE 1 *Phosphorus Partition in Whole Blood*
C₀—average of controls (20 cases)
C₁—weighted average of controls, including Stearns and Warweg's patients (49 cases)
R—average of patients with rheumatic fever (18 cases)

problem of 65 patients in this clinic who had rheumatic fever and had clinical records antedating the proved diagnosis, as summarized in Figures 2 and 3, is strongly suggestive that the factors which tend to lower the hosts' resistance in this disease are important

In this group comparatively large families (with

TABLE 2 *Phosphorus Partition in Whole Blood of Active Tuberculosis Controls*

| AGE | ACID SOLUBLE PHOSPHORUS | LIPID PHOSPHORUS | TOTAL PHOSPHORUS | RED-BLOOD-CELL COUNT |
|---------|-------------------------|------------------|------------------|----------------------|
| yr | mg per 100 cc | mg per 100 cc | mg per 100 cc | ×10 ³ |
| 5 | 27.4 | 11.1 | 39.8 | 4.0 |
| 6 | 27.6 | 12.0 | 39.4 | 4.7 |
| 7 | 27.8 | 11.0 | 38.6 | 4.0 |
| 11 | 27.3 | 11.5 | 41.5 | 4.7 |
| 11 | 23.5 | 13.5 | 38.5 | 4.5 |
| Average | 26.7 | 11.8 | 39.6 | 4.4 |

an average of seven members) lived on incomes averaging about \$15 a week Consistent with the low incomes, more than 70 per cent of the patients had been inadequately nourished for several years The nutritional histories showed that the diets were relatively rich in carbohydrates and

starches and relatively poor in proteins, minerals and vitamins. Many of these children were ailing several months before they developed clinical signs and laboratory evidence that resulted in a diag-

weight over periods of six months or longer. Anorexia was a commonly associated complaint.

Numerous studies⁴⁻¹⁵ indicate that rheumatic fever has a much higher incidence among the

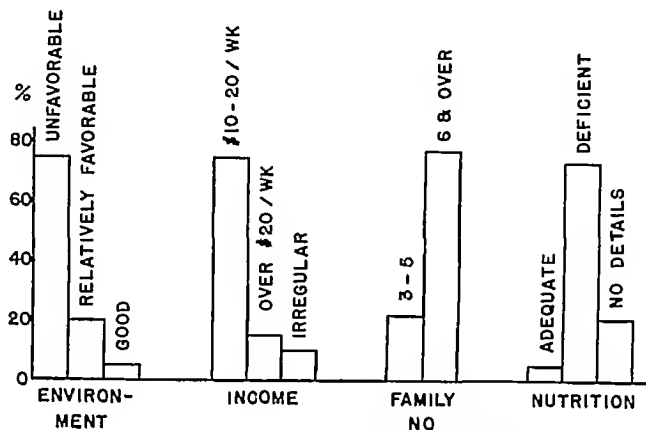


FIGURE 2 Contributory Factors in Early Cases of Rheumatic Fever

nosis of rheumatic fever. Each patient included in our group had been followed for a varying length

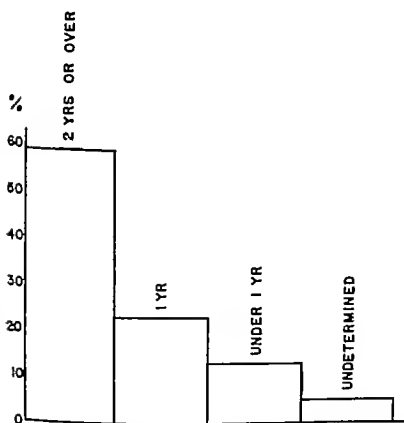


FIGURE 3. Duration of Symptoms before Development of Clinical Signs and Laboratory Evidence Which Resulted in a Diagnosis of Rheumatic Fever

of time (three months to five years) before the diagnosis of rheumatic fever was entertained.

The most tangible evidence of undernutrition in the patients studied was a cessation of gain in

economically handicapped than among the economically independent. Those who emphasize the spread in recent years of rheumatic fever in localities said to have formerly been relatively free from the disease should take into consideration the gradual development of living conditions in these areas similar to those found in areas where the disease has been prevalent. The diets under such conditions tend gradually to become deficient in proteins, minerals and vitamins and relatively rich in the carbohydrates and starches found in less expensive foods.

Chronic fatigue was also manifested in our patients, first by lassitude and inactivity, secondly by nervous instability and wasteful overactivity. Restless, fitful sleep disturbed by night terrors was not unusual. Respiratory infections accelerated the decline in health of the patients, together with the gradual appearance of recurrent episodes of muscle joint and visceral pain, both diffuse and localized.

This prevalence of chronic fatigue, followed later by many symptoms involving muscular tissue, raises the question of possible disturbances of metabolism of muscular tissue. Although our knowledge of the chemical reactions which occur during muscular contraction and recovery is far from complete, phosphorus compounds are considered essential for normal activity. Fiske and Subbarow¹⁶ followed by Eggleston and Eggleston¹⁷ isolated phosphocreatine from muscle in 1927.

Chemical analyses have shown that probably 80 per cent of the creatine in resting muscle occurs as phosphocreatine. The theory has been advanced that the cleavage of phosphocreatine is the primary change that supplies the energy for normal muscular contraction. Phosphate esters including the nucleotide, adenylypyrophosphate, apparently play intermediary roles in muscular contraction and recovery.

Presumably anemia in itself should reduce the total phosphorus of whole blood. Control patients were chosen who had a reduction in erythrocytes and hemoglobin corresponding to that found in the patients who had rheumatic fever. The average hemoglobin value in both groups was about 75 per cent. The average erythrocyte count of the 20 controls was 4,500,000, and with few exceptions the count in the individual case was well over 4,000,000. The lowest control values were in a child who had lost considerable blood in the stools. His blood phosphorus values were low normal. Hematocrit readings were taken in 18 patients, including 12 with rheumatic fever. The average value for the latter was 40 per cent, as compared with 42 per cent for the controls.

SUMMARY

The phosphorus content of the whole blood has been found to be relatively low in children with rheumatic fever, as compared with that of patients

who are in a better state of nutrition, and with that of patients convalescing from acute and other chronic illnesses.

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END RESULTS OF USE OF LARGE DOSES OF AMPHETAMINE SULFATE OVER PROLONGED PERIODS*

WILFRED BLOOMBERG, M.D.†

BOSTON

AMPHETAMINE (Benzedrine) sulfate was introduced into therapy in December, 1935.¹ Since our report of its use in narcolepsy, many studies have been carried out, and numerous reports have appeared in the literature which deal with the physiology, clinical uses and toxicology of this interesting drug. The effects of amphetamine on blood pressure, mood, intelligence and gastrointestinal functions have been exhaustively studied. The great majority of reports, however, deal with the effect of single doses, or of small doses over a comparatively short period of time. Ulrich² in October, 1937, reported follow-up studies on some of his narcoleptic patients

after months of treatment. However, the effect on the bodily physiology of extremely large doses over comparatively long periods of time has not so far been reported. It seemed worth while, therefore, to present the results of studies of 3 patients with narcolepsy who have been taking at least 70 mg of amphetamine sulfate every day, for two years and eight months in 2 cases, and for one year and eight months in 1. Two of the patients were cases in our original series, and the third started treatment some time after the original group.

METHOD

The three patients all suffered from narcolepsy and cataplexy. In 2 cases these symptoms developed after an attack of encephalitis lethargica, and

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in 1 of these the narcolepsy was accompanied by postencephalitic parkinsonism, in the third case the narcolepsy was of the so-called idiopathic type. Two patients were women aged twenty-seven and twenty-three, and 1 was a man aged sixty-two. In 2 cases fairly complete laboratory studies of the pre-treatment period were available in the third these were unfortunately not at hand.

In the follow-up studies, each of the 3 patients

informed of smears. A careful history was taken, and general physical and neurological examinations were made. In taking the history, special emphasis was placed on eliciting evidence of abnormal cutaneous manifestations and of gastrointestinal symptoms.

Not every one of the tests was carried out on each patient, but a sufficient number of laboratory investigations was made in each case to uncover any abnormality of function of any system

TABLE 1 Comparison of Laboratory Findings Before and After Prolonged Use of Large Doses of Amphetamine (Benzedrine) Sulfate in Three Patients with Narcolepsy

| FACTS AND TESTS | CASE 1 Female 27 | | CASE 2 Female 23 | | CASE 3 Male 62 | |
|--|---|-----------------|-------------------------------------|-----------------|--|------------------|
| Diagnosis | Postencephalitic narcolepsy; cataplexy | | Narcolepsy; cataplexy; migraine (?) | | Postencephalitic parkinsonism; narcolepsy; cataplexy; obstructive prostate | |
| Dose of amphetamine | 110-120 mg. daily (1 yr.) 0-80 mg. daily (1 yr. 8 mo.) | | 80 mg. daily (2 yr. 8 mo.) | | 70-100 mg. daily (1 yr. 8 mo.) | |
| | Before | After | Before | After | Before | After |
| Hemoglobin (per cent) | 80, 82 | 78 | 95 | 96 | — | 77 |
| Red-cell count (millions) | 4.1, 5.3 | — | 4.8 | 4.8 | — | 4.0 |
| Blood sugar | Normal | Normal | Normal | Normal | — | Normal |
| White-cell count (thousands) | 9.2 | 6.1 | 7.6 | 8.6 | — | 6.9 |
| Differential white-cell count. | Normal | Normal | Normal | Normal | — | Normal |
| Urine | Occasional albumin | | Negative | | — | Trace of albumin |
| Phenolsulfonephthalein test (per cent) | — | 35 | — | 50 | — | 55 |
| Nonprotein nitrogen (mg. per 100 cc.) | 34 | 24 | — | 28 | — | 26 |
| Blood sugar (mg. per 100 cc.) | 87 | 87 | — | 89 | — | 101 |
| Creatinine (mg. per 100 cc.) | — | 1.2 | — | — | — | 1.5 |
| Blood pressure (mm. of Hg.) | 110/80 | 105/70 to 90/50 | 120/80 | 110/65 to 80/50 | — | 120/75 |
| Basal metabolic rate (per cent) | -25 rising to -5 on thyroid (7½ gr. daily) | -17 -23 | — | -6 | — | -5 |
| Electrocardiogram | Normal rhythm; T _a = 1.5 mm. | | Low T waves (? significant) | | — | — |
| Mossenthal test (range) | — | | 1.018 to 1.024 | | — | 1.020 to 1.022 |
| Takata-Ara test | — | | Negative | | — | Negative |
| Icteric index (per cent) | — | | 5 | | — | 5 |
| Seven-foot x-ray plate | — | | Normal | | — | Normal |

was admitted to the hospital for a period of observation and study of at least three days. In order to determine whether there were any toxic effects on the kidneys, urine examinations, Mosenthal tests and phenolsulfonephthalein excretion tests were carried out, and the blood nonprotein nitrogen was determined. For the effect on the liver, icteric index and Takata-Ara tests were done. The effect on the cardiovascular system was studied by four hourly blood-pressure readings during the entire stay in the hospital, and by seven foot heart x-ray plates in 2 cases. In 1 case in which a pre-treatment electrocardiogram had been taken, this was repeated.

The endocrine system was studied by determination of the basal metabolic rate and the blood sugar, and by charting the pulse rate, as well as by inquiring into a history of change in weight. The blood was studied by counts and the exam-

COMMENT

Reference to Table 1 will show that in spite of the massive doses of amphetamine, continued over a comparatively long period, no significant abnormality was found in any of the tests. The temperature, pulse and respiratory rate were normal throughout. There was no increase in the basal metabolic rate and no rise in blood pressure. There was no evidence of damage to the kidneys or liver. The blood and certain of its constituents showed no deviation from the normal.

General physical and neurological examinations were entirely negative in all cases. None of the patients had suffered skin or gastrointestinal disturbances. They were all keeping awake on amphetamine sulfate, and were able to carry on their work. Cataplexy was almost entirely relieved in each. None of them had had to increase

the dose of amphetamine after the adjustment period of the first few weeks, and one (Case 1) had actually found that she could lower it. None of them felt any craving for the drug or was unwilling to stop taking it during the study period. The usual comment was, "Now that I'm in bed and have nothing to do and don't mind sleeping, I don't mind not taking the pills."

My recent experience with amphetamine sulfate has included the treatment of a great number of alcoholic patients. These patients do not, of course, take such large doses, but some of them take as much as 50 mg per day, and in no case in my series has there been any significant difficulty attributable to the drug for more than a day or so. No patient in my experience has had to give up his medication because of untoward side effects. Nor have I observed any evidence, in either the narcoleptic or the alcoholic group, of addiction, habit formation or increase in tolerance after the first two or three weeks of treatment. Incidentally, though other writers have warned against the use of amphetamine sulfate outside the hospital, all these patients have been ambulatory, and no difficulties have been en-

countered because of this fact. One alcoholic patient did, indeed, because of his state of intoxication at the first interview, misunderstand his instructions. He thought the tablets were a sedative, and so took more and more as he became more excited. He had finally consumed 150 mg in about fourteen hours, but other than a sleepless night and a jumpy irritability, lasting about thirty-six hours, he suffered no ill effects.

SUMMARY AND CONCLUSIONS

Three patients with narcolepsy who had been taking 70 mg or more of amphetamine sulfate daily for two years and eight months in 2 cases, and for one year and eight months in 1 case, were studied.

No significant deviation from normal, as a result of this large dosage, was found in any case by any laboratory or clinical study.

No evidence of addiction or habit formation was found.

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PREVENTION AND MANAGEMENT OF PAIN FOLLOWING CHOLECYSTECTOMY*

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BOSTON

A GREAT deal has been said and written in recent years concerning unsatisfactory results following surgical removal of the gall bladder. After being exposed to a procedure of such magnitude the patient expects to enjoy good health and freedom from symptoms. Unfortunately, in many cases the pain and discomfort return, and are as severe after operation as they were before it.

We have divided our cases into two groups: those in which the pain was produced from the beginning, by disturbances outside the biliary system, and those in which the symptoms were caused primarily by disease in the biliary tract and in which cholecystectomy was a necessary procedure. In the first group, obviously no relief can result from removal of the gall bladder, even though it might incidentally have been diseased. It is with the second group of cases that this paper is concerned.

In order to prevent recurrence of biliary colic

after operation, it is necessary for the surgeon to have a complete understanding of the physiologic disturbance involved. McGowan, Butsch and Walters¹ early in 1936 demonstrated that biliary pain could be produced by increased pressure within the bile ducts. This pressure is often due to obstruction in the common duct, which may be the result of an unsuspected stone, swelling in the head of the pancreas, a stricture of the common duct or spasm of the muscle at the lower end of the common duct. It was found that morphine produced this spasm, and in a number of cases the resulting back pressure in the bile ducts produced biliary colic. The drug when given in large doses relieved the pain by acting on the cortical centers, but it augmented and prolonged the spasm. In this way it exposed the bile ducts to periods of distention lasting from eight to twelve hours.

When the bile ducts are dilated, high tensions are developed within them as a result of increased pressure. These tensions are poorly withstood by the thin-walled ducts and pain results. Morphine relieves the pain, but appears to shorten the inter-

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val between subsequent attacks. Inhalation of amyl nitrite or the sublingual administration of glyceryl trinitrate (nitroglycerin) relaxes the spasm, reduces the pressure and relieves the pain (Fig 1) Nitroglycerin, in doses of one or two

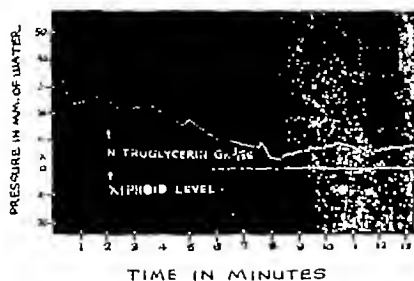


FIGURE 1

Pressure-tracing of the common duct showing only a slight increase in the resting pressure. Reduction of the pressure by means of glyceryl trinitrate indicates the presence of duodenal spasm. Roentgenograms of this case are illustrated in Figure 3

tablets, each containing 1/250 gr., has been found to be of consistent potency. In a recent publication² it was shown that the sphincter mechanism of the common duct is the muscle of the duodenal wall. Since a physiologic sphincter functioning independently of the duodenal wall has never been demonstrated, it seems proper to use the term "duodenal spasm" where the term "spasm of the sphincter of Oddi" is generally employed. The physiological principles just outlined should be kept in the foreground of the surgeon's mind if he is to prevent biliary complications after cholecystectomy. The first step in this direction is the proper use of T-tube drainage of the common duct.

T-TUBE DRAINAGE

T-tube drainage decompresses the ducts of the biliary tree. This allows the ducts in many cases to return to normal size and the inflammation in them to subside. The ducts are then able to withstand higher pressures without producing pain. An indwelling T tube in the common duct allows future detailed study of the patency of the papilla of Vater by a series of pressure studies. Also, it permits roentgenographic studies for the detection of missed common-duct stones.

At the time of operation the common duct may be opened in most cases before removal of the gall bladder. The clamped cystic duct may be used as a retractor to steady the common duct. Indications for opening the duct are a history of

jaundice, the presence of a palpable stone in the duct, a markedly dilated duct and inflammation in the head of the pancreas. Lahey³ estimated that 40 per cent of all cholecystectomies should be accompanied by exploration of the common bile and hepatic ducts. In each case a T tube should be left in the common duct for drainage.

During exploration of the common duct the patency of the papilla of Vater should be determined by passing graduated, soft woven catheters down through the common duct into the duodenum. Zollinger⁴ has stated that No. 10 Fr. is the size of the average lumen of the papilla of Vater in the human subject. Overdilation of the papilla of Vater may lead to scar formation, and to narrowing of the lumen to less than its original size.

The T tube is best brought to the surface in the center of the wound. It should be placed so that there is an excess of tube between the common duct and the abdominal wall. This allows a certain play on the tube by the movements of the abdominal wall in respiration. If this precaution is not taken the gradual pull on the tube will kink the common duct. The tube should be fastened to the skin with a silk suture. Care must be taken not to constrict the tube.

In the aftercare of these patients it is very important to have a proper method for collecting the bile. Nothing must be attached to the tube which might pull on it. A suitable apparatus consists of an 8-ounce flat medicine bottle with a baby's nipple attached. The bottle is fastened to the binder by means of adhesive tape. The end of the T tube should be pushed through a hole in the nipple. This hole must be sufficiently large to allow the escape of air. If not, pressure within will stop drainage. After the patient becomes ambulatory, a small hot water bottle with a metal tube inserted through the stopper makes a convenient bag for collecting bile.

Two weeks after operation tests are carried out in order to determine the probable duration of T-tube drainage. These consist in determinations of the resting intrabiliary pressure, and of the perfusion pain level and roentgenographic studies of the biliary tract.

RESTING INTRABILIARY PRESSURE

The resting intrabiliary pressure is measured by a special apparatus, described elsewhere.¹ This apparatus is built around an ordinary Y shaped glass tube. The stem of the Y is attached by means of a rubber tube to a bottle of intravenous saline solution. To each limb of the Y tube is attached a rubber tube one of which is to be connected to the T tube in the patient, the other to

an upright spinal manometer. The tubing is filled with saline solution from the reservoir bottle before it is connected to the patient. The zero level of the manometer should be placed at the level of the xiphoid process of the sternum. The resting fluid level in the manometer is ordinarily at about this point. If the resting fluid level is considerably above the base line, say 30 to 100 mm, one should suspect some partial obstruction in the lower end of the common duct. This may be due

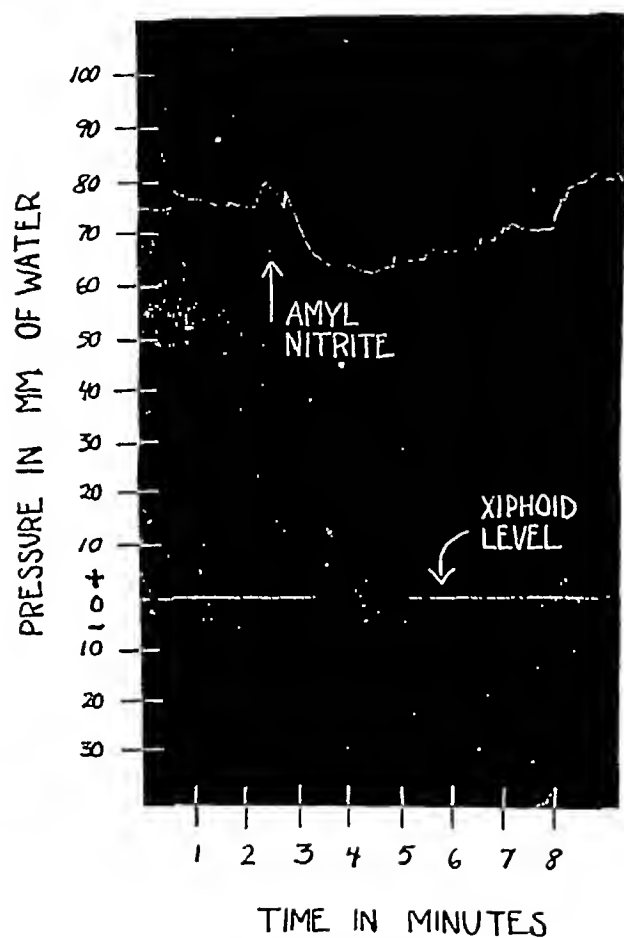


FIGURE 2

Pressure tracing of the common duct illustrating a moderate increase in the resting pressure above the normal. Amyl nitrite produced only partial reduction in the pressure. This shows that the pressure is due partially to spasm but chiefly to a more permanent cause. Roentgenograms of this case are illustrated in Figure 4.

to pressure from inflammation in the head of the pancreas, spasm of the musculature of the duodenal wall, a missed stone in the common duct or edema of the duodenal mucosa at the ampulla of Vater.

Five deep inhalations of amyl nitrite will aid in determining the nature of the obstruction. If this medication reduces the pressure to normal, the obstruction is due entirely to spasm. If it fails

to reduce it, the obstruction is of a more permanent nature. If it reduces it incompletely, obstruction is due partially to spasm and partially to some more permanent cause (Fig. 2).

PERFUSION PAIN LEVEL

Perfusion of the common duct is done in order to determine the amount of pressure that it will withstand without producing discomfort. The lowest pressure level in the common duct at which the patient complains of pain is referred to as the "pain level." Some patients experience pain when the biliary tree is exposed to relatively low perfusion pressures, at times not over 70 mm of water. In other cases pressures of 500 mm or more may be tolerated without discomfort. There are two reasons for this difference. In the first place, if the bile ducts are dilated, high tension is developed by relatively low pressures. Secondly, if the ducts are inflamed from the presence of infection, they withstand pressure rather badly. The bile passages should be able to resist pressures of 300 mm of water without producing pain. This is usually the maximum secretion pressure of the liver. If pressures below 300 mm of water produce pain or discomfort, the patient may expect to have recurrence of distress after removal of the T tube. On the other hand, if the bile ducts are decompressed for a sufficiently long time by T-tube drainage, dilatation and infection will improve and the bile ducts can resist relatively high pressure. Under these circumstances, if the patient subsequently has duodenal spasm for a few hours the resulting back pressure in the bile ducts will not produce pain.

To determine the pain level the pressure apparatus is connected to the patient as described. The reservoir bottle is lowered until its fluid level is the same as that of the zero level of the manometer. The clamp is taken off the rubber tube from the reservoir bottle, which is slowly elevated until the patient experiences discomfort. The fluid level in the manometer is then read. This reading is the pain level. The tube from the reservoir bottle is reclamped. The fluid in the manometer then falls in two to five minutes to a level equal to the resting intrabiliary pressure. The perfusion pain level should be over 300 mm of water, the resting intrabiliary pressure should be less than 30 mm of water.

ROENTGENOGRAPHIC STUDIES OF THE BILIARY TRACT

For roentgenographic studies the patient is placed flat on his back on the x-ray table and all the preparations to take the pictures are made,

10 cc. of Diodrast* in a syringe is injected slowly into the T tube. A roentgenogram is taken immediately. The tube is clamped, and a second roentgenogram is taken ten minutes later. Study of the films will show whether any obstruction to the flow of bile into the duodenum exists. Obstruction is indicated by extreme dilatation of the main ducts and small branches of the biliary tree,

Stricture of the mucous membrane of the ampulla of Vater is indicated in the lower end of the common duct by the presence of a blunt rounded termination (below 6 in Fig 4B).

In these cases the opaque medium frequently outlines the proximal portion of the pancreatic duct. When the medium is injected, epigastric pain is often experienced. This pain is undoubt-



FIGURE 3

A. This film shows the common duct under resting conditions. The numbering in this illustration and in Figure 4 is as follows: 1 common duct 2, point at which the bile enters the duodenal lumen 3 contrast medium in the duodenum 4 hepatic ducts and the finer radicles in the biliary tree 5 pancreatic duct 6 point at which the common duct begins to penetrate the musculature of the duodenal wall 7 T-tube 8 cystic duct 9 Sawyer tube passed through the nose into the duodenum. Definite narrowing of the common duct can be seen at 6. This is due to spasm. The portion of the duct between 6 and 2 is that part which tunnels the duodenal wall the intramural portion.

B. This film of the same case was taken ten minutes after the subcutaneous injection of $\frac{1}{4}$ gr. of morphine. The spasm at 6 has greatly increased producing almost complete obstruction. The common duct is much more distended as a result of back pressure.

and by failure of the ducts to empty after a ten minute interval. Spasm of the duodenal musculature is indicated on the x-ray film by a narrowing of the lower end of the common duct to a sharp pencil point (6 in Fig 3A and B); this is not present in pictures taken one minute after five deep inhalations of amyl nitrite. Duodenal spasm may be indicated by roentgenographic study of the duodenum under a special method previously described.²

*Supplied through the courtesy of the Winthrop Chemical Company, New York City.

edly due to pressure within the pancreatic duct. It is complained of occasionally by sufferers from biliary tract disease, and tends to complicate the differential diagnosis between cholecystitis and peptic ulcer.

Unsuspected stones in the common duct can frequently be made to pass by applying the following procedure. Attach the pressure apparatus to the T tube and slowly raise the perfusion pressure to the level of toleration or to 500 mm. of water. Then have the patient take five deep inhalations

of amyl nitrite. Frequently the sudden release of spasm will allow the pressure of the saline solution to force the stone into the duodenum. This procedure may be repeated as often as desired until roentgenograms show disappearance of the stone.⁵

LATER CARE

About two weeks following operation the patient is instructed to begin clamping off the T tube. Starting with a half hour twice daily, the time is increased until the tube is clamped off all the time. If the patient experiences distention or

In the case of postoperative patients in which cholecystectomy was performed without T-tube drainage, we prescribe glyceryl trinitrate for nausea, distention or biliary colic. During the first few days after operation we use dilaudid freely for the control of pain. Any untoward symptoms caused by this drug may be neutralized by glyceryl trinitrate.

MEDICAL TREATMENT OF BILIARY-TRACT DISEASE

The patient who returns several months or years after cholecystectomy complaining of repeated at



FIGURE 4

A This is a choledochogram taken under resting conditions, showing moderate spasm at 6 and stricture of the ampulla of Vater at 2

B Following inhalation of amyl nitrite the spasm has disappeared at 6, the opaque medium has been allowed to flow freely into the ampulla of Vater and, finding obstruction at the duodenal mucosa, has regurgitated into the pancreatic duct. The patient experienced severe midepigastria pain at this time

pain during the clamping he is instructed to place one to two 1/250 gr tablets of glyceryl trinitrate under the tongue. If he does not obtain relief of pain in five minutes, the tube is unclamped and allowed to drain. The tube may be removed in three weeks or left in for six months, as indicated.

If the patient can keep the tube clamped off continuously for three weeks and be free of pain, it is safe to remove it, provided the pain level is above 300 mm of water, the resting pressure level is below 30 mm of water, and the roentgenograms show absence of stones and free emptying of the T tube. The patient is instructed to take glyceryl trinitrate as required for distention or pain.

tacks of typical biliary colic presents a problem to the surgeon. A diagnosis of biliary dyskinesia can usually be made by the characteristic location of the pain in the right subcostal region, extending around into the right scapular region. At times the pain reaches the tip of the shoulder, or it may extend down into the lumbar region and direct one's attention to the kidney. A test dose of morphine, 1/6 gr given subcutaneously, will usually bring on a characteristic attack of pain in five minutes to one-half hour. An induced attack is readily relieved by inhalation of amyl nitrite or by sublingual administration of one or two 1/250 gr tablets of glyceryl trinitrate.

In such cases we prescribe one or two 1/250 gr tablets of glyceryl trinitrate every three hours for three days, and one three times daily after meals and at bedtime for three weeks. This procedure keeps the pressure in the biliary system at a low level and promotes a free flow of bile into the duodenum. The patient is allowed a general mixed diet. Cooked fats and fried foods are eliminated. The patient is encouraged to take cream and eggs freely. This course of treatments produces permanent relief of symptoms in most cases. If this treatment fails, a second operation must be considered in order to explore the common bile duct for missed stones.

We have used similar treatment in cases of cholecystitis with gall bladders that fill and empty freely and do not contain stones. We have had 6 such cases with symptoms of cholecystitis for two to fifteen years, the patients varying in ages from twenty-two to sixty five years. After a course of treatment as outlined they have been entirely symptom-free for periods up to one and a half years. We have found this treatment useful for 4 patients with stone filled gall bladders, in whom a surgical procedure carried an increased risk because of advanced age, hypertension or coronary disease. All have been rendered symptom-free by a course of glyceryl trinitrate. They frequently report prompt relief of individual attacks after single doses. Two of these patients were moderately jaundiced when treatment was started. Icterus disappeared in a few days and has not returned. One patient has been symptom free for one year and the other for four months. One of the others has since had an attack of cerebral hemiplegia, proving the advisability of deferring operation.

We do not advise this treatment in cases of cholelithiasis except as a temporary procedure or when operation is contraindicated. We believe at present that a stone filled gall bladder or one which is not functioning should certainly be removed if the patient's condition permits.

SUMMARY

Biliary colic following cholecystectomy is due to obstruction of the common duct preventing the flow of bile into the duodenum. Obstruction of the common duct may be due to stone, stricture, edema or spasm. The back pressure results in pain. Common-duct pressure of 70 mm. of water produces pain in some individuals, while 500 mm may be withstood by others with impunity. Prolonged T-tube drainage allows the common duct to resist greater pressures. Glyceryl trinitrate relaxes duodenal spasm and tends to lower the resting intrabiliary pressure. Methods of studying the patency of the papilla of Vater and the condition of the bile ducts are described.

Biliary dyskinesia and many symptoms of cholecystitis are relieved by a course of treatment consisting of the daily use of glyceryl trinitrate to relax duodenal spasm.

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A left nephrectomy was performed an atrophic hydronephrotic kidney being removed without difficulty. The ureter appeared normal except at the ureteropelvic junction, where there was definite narrowing and evidence of chronic perireteral inflammation and fibrosis. No aberrant vessels were discovered. The pathological report was as follows:

The specimen consists of a kidney measuring 6 by 3 cm. The cortex is extremely rough and granular while the cut surface shows a replacement of the normal parts by numerous large dilatations of the calyces. Inflammatory changes are apparent in the walls. The function in this kidney had apparently ceased. The tubules are atrophic and there is a tremendous infiltration of mononuclear leukocytes, lymphocytes, plasma cells, neutrophils and eosinophils. A great deal of interstitial hemorrhage has taken place. Diagnosis: Chronic pyelonephritis and hydronephrosis.

This is the history of a 16-year-old girl with a seven year story of left lumbar pain, with one hospital admission because of pyuria, who was not studied urologically until seven years after the onset of symptoms. There was a combination of impaired development and kidney destruction, both of which might well have been obviated by judicious dilatation of the ureter and treatment of the infection when the signals of distress were first evident.

CASE 2. A. F., a 34-year-old married woman 5½ years previous to admission when 3 months pregnant, developed an attack of pain in the right kidney region accompanied by pyuria. She was hospitalized for 5 days, during which time an unsuccessful attempt was made to perform pelvic lavage. One and a half months later and again 2 weeks postpartum she suffered recurrences. These attacks were accompanied by chills, fever and nausea. Since then she had had about one attack of pain per year each attack lasting 3 or 4 days. Between attacks she had been symptom-free. No x-ray photographs had ever been taken. The last episode began 3 days before admission with a dull pain in the right costovertebral angle, radiating to the right upper quadrant of the abdomen. There was slight dysuria and the urine had become reddish.

Physical examination revealed no abnormalities. The urine showed a large amount of albumin but no sugar. The sediment contained many red and white blood cells.

Cystoscopy revealed a rather prominent right ureteral orifice with an orifice barely large enough to admit a No. 6 Fr catheter. Forty cubic centimeters of milky fluid was obtained from the right kidney pelvis and 3 cc. of clear urine from the left kidney pelvis. A phenolsulfonphthalein functional test showed no excretion on the right side. A culture of the urine from the right kidney was reported as positive for *Bacillus proteus* and one of that from the left as negative. Retrograde urography showed right nephrolithiasis, marked hydronephrosis and hydroureter involving the entire ureter down to the ureterovesical junction (Fig. 2).

A right nephrectomy and partial ureterectomy was performed. Only a moderate amount of perirenal reaction was encountered. In view of the proteus infection and the extensive involvement of the ureter a nephroureterectomy had been planned but the condition of the patient

did not warrant so extensive a procedure. Consequently a complete ureterectomy was postponed. The pathological report was as follows:

The specimen consists of a kidney and attached ureter. The latter is thick walled and tremendously dilated. The kidney is increased in size. The surface shows many fetal lobulations. The cut surface shows tremendous dilatation of the pelvis and calyces, which has converted the organ into a large, thin-walled cyst like structure. The wall of the pelvis is thick, granular and congested. The organ contains one large stone



FIGURE 2.

Note the extensive hydronephrosis and hydroureter

which measures 2.0 by 1.5 by 1.5 cm., and three smaller stones averaging 5 mm. in diameter. The kidney tissue weighs only 100 gm. Sections throughout the pelvis show a tremendous chronic inflammatory reaction. The glomeruli are engorged with blood, and the surrounding tubules exhibit granular degeneration. Throughout the medullary portion chronic inflammatory changes are visible. Diagnosis: Nephrolithiasis, hydronephrosis and chronic ascending interstitial nephritis.

Two and a half weeks postoperatively specimens of bladder urine and fluid from the right ureter while showing numerous white cells, were negative on culture. Accordingly ureterectomy was postponed in order to see whether the pyuria could not be controlled by other measures. Three months later the patient was symptom-

free, and the urine showed only occasional white cells. Apparently ureterectomy will not be necessary.

This case had a five-and-a-half-year history of renal pain and chronic infection. Adequate treatment of the infection and dilatation of the ureter early in the course of the disease might well have averted this sequence of events.

CASE 3 H N, a 41 year-old, married woman, 8 years previous to admission began having attacks of sharp pain over the left lower ribs in the axillary line. The pain did not radiate to the flank or costovertebral angle, nor was it



FIGURE 3

Note the large kidney with massive dilatation of the calyces

influenced by respiratory movements. It was severe enough at times to cause perspiration. The attacks lasted half a day and recurred every 3 months to 1 year until 4 years previously, since when there had been only minor episodes of pain in this area. There were three episodes of transitory gross hematuria following attacks of pain. No history of dysuria, frequency or nocturia was obtained. The patient was referred to the hospital for study because of pyuria and a systolic blood pressure of 160.

Examination, except for hypertension, was not remarkable. The urine showed a slight trace of albumin and a sediment containing innumerable white blood cells.

Cystoscopy showed a normal bladder mucosa. The ureteral orifices and bladder neck appeared normal. A No. 6 Fr catheter was passed to the right kidney pelvis. A catheter could be passed only about halfway to the left kidney pelvis. No residual urine was aspirated from either side. The urine from the right kidney pelvis was normal, that from the left ureter showed many white blood cells.

A phenolsulfonephthalein test was normal on the right side, and zero on the left. Culture of the urine from the left ureter was negative, that of the bladder urine showed streptococci. Retrograde pyelography revealed a sharp angulation of the left ureter at the level of the fourth lumbar vertebra, beyond which neither catheter nor Diodrast solution passed. What appeared to be a greatly enlarged kidney shadow extended from the iliac crest to above the 11th rib. Intravenous pyelography showed faint, widely separated splotches of media characteristic of extensive hydronephrosis (Fig. 3).

Nephrectomy was performed, a large, hydronephrotic kidney being removed. Immediately below a greatly dilated pelvis there was an S-shaped kinking of the ureter, which was maintained by adhesive bands, thereby forming a marked obstruction to the ureteral flow. This obstruction was located at about the level of the 4th lumbar vertebra. The pathological report was as follows:

The specimen consists of a kidney which has been very largely converted into a series of cyst like pockets, all of which are filled with a blood tinged fluid. The renal parenchyma has thereby been reduced to a small rim of tissue except at the lower pole, where an intact portion measuring 2 by 2 cm remains. The thin rim of the cortex shows atrophy of the glomeruli and tubules, and heavy round-cell infiltration. Diagnosis: Hydronephrosis, with chronic inflammation.

This case presents an eight-year history of some what atypical renal pain, with three attacks of gross hematuria (not even hematuria induced her to seek adequate study) and eventual destruction of the kidney due to ureteral obstruction and infection. A nephropexy with a lysis of adhesions might have overcome the obstruction if undertaken early enough. However, only the end result was observed, and the low position of the kidney may well have been due simply to its enlargement. As a result, it is difficult to say what operative measures would have been necessary, but certainly they would have been no more radical than those that were ultimately adopted. This patient was originally on the medical service for study of her hypertension. The presence of pyuria and the history of the case suggested the possibility of hypertension due to unilateral renal disease and hypertension. However, the blood pressure became normal soon after admission and before operation. Following discharge from the hospital the hypertension recurred.

CASE 4 H H, a 45 year-old man, complained of painless hematuria of 1 week's duration. He had no other complaints, aside from a feeling of lassitude. For the last 31 years he had had numerous attacks of colicky pain in the left costovertebral region and left flank, unaccompanied by chills, fever or symptoms of bladder irritation. These attacks were severe enough to require repeated injections of morphine. So far as he knew, his urine had never shown anything abnormal. No urological studies had ever been made.

Physical examination gave essentially negative results. Cystoscopy revealed a normal bladder, with grossly bloody fluid issuing from the left ureteral orifice. Retro-

grade pyelography showed kinking of the ureter and distortion of the renal pelvis by what appeared to be a tumor mass. Hydronephrosis was also present (Fig. 4)

At operation a slightly enlarged kidney was found.



FIGURE 4

Note the deformity of the renal pelvis and calyces and the presence of a ureteropelvic stricture

The pelvis was greatly distended by a large intrapelvic mass, which proved to be a large papilloma with malignant changes at its base, and was reported by the Massachusetts Tumor Diagnosis Service as epidermoid carcinoma. A

two-stage nephroureterectomy was performed. The ureter showed no involvement.

The patient was apparently well 1½ years after the operation but there has been no follow-up cystoscopic examination to check the possibility of bladder implants. The urine was negative except for the slightest possible trace of albumin.

The evidence in this case is, of course somewhat presumptive, but it seems reasonable to suppose that sometime during the thirty-one year period of recurrent left renal pain it would have been possible to remove this kidney in its precancerous state.

Sir Thomas Lewis* has said of pulsus alternans "It is the faint and anguished cry of a fast failing muscle, which, when it comes, all should strain to hear, for it is not long repeated. A few months, a few years at most, and the end comes." This clinical metaphor may well be applied to renal pain, for though the latter requires no straining for an audition when it comes, it too is the anguished cry of an organ that is failing, or may fail. And having been heard, it should be heeded, for unlike the helpless voice of pulsus alternans, this voice is a cue which may render possible the rescue of an organ or an individual from an insidious death.

SUMMARY

The end results of four cases in which renal pain was allowed to recur unheeded are herein illustrated. That these cases came to light on a small urological service within a short period of time suggests the number of similar cases which probably occur in the country at large.

With this in mind, a reiteration of the results of failure to investigate renal pain appears to be warranted.

32 Summer Street.

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CLINICAL NOTE

AN INGESTED FOREIGN BODY
IN THE BUTTOCK*

Report of a Case

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INJURIES to the lower part of the rectum and anal canal from foreign bodies are caused either by objects' being introduced into the rectum by

of these report the actual presence of foreign bodies in the rectum rather than give information as to the damage that can be inflicted by them on the rectum, anus and surrounding tissues. The majority of objects referred to in these reports had been inserted into the rectum from below and were found free in it. So far as I know, there are no cases on record in which an ingested foreign body had pierced the rectal or anal walls and lodged in the tissues external to the rectum.

Two cases are cited, however, in which foreign bodies introduced into the rectum were found in the perirectal tissues and not in the lumen. Say

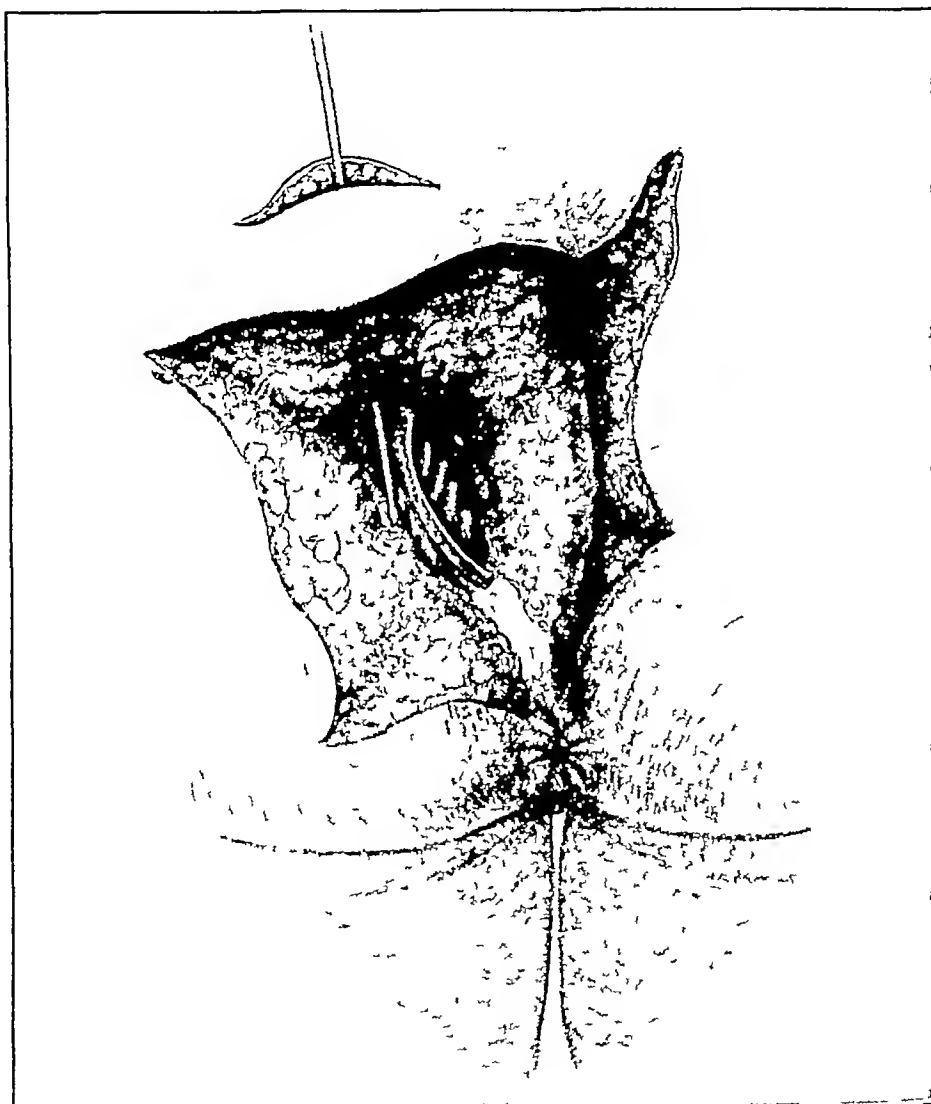


FIGURE 1

way of the anus or by injurious substances or articles ingested with certain foods.

A review of the literature of the last twenty years has shown a fairly large number of papers dealing with foreign bodies in the rectum. Most

ers¹ removed a wooden penholder from an abscess in the tissues adjacent to the coccyx, the object having been introduced into the rectum by the patient as an erotic act. Landsman² cited a case of encysted foreign body in the rectum that was mistaken for a malignant tumor.

This paper reports a case of a localized abscess,

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an anal fistula and an encapsulated mass, somewhat superficial and posterior to the left ischio-rectal space, subsequent to the ingestion of a chicken bone. The foreign body was found in the tissues of the buttock in a glistening, encapsulated cavity, which had been ruptured by a recent injury to the tissues superficial to the cavity

CASE REPORT

A 47 year-old woman called to see Dr N S Scarcello, of Worcester complaining of tenderness in the left buttock, which was preceded by a fall 2 days previously. The patient was advised to take hot sitz baths. About 1 week later she said that the night before she had had chills and felt feverish and that a painful lump had developed near the point she struck when she fell. The patient was referred to me on October 31 1939.

Examination revealed a large, brawny indurated area in the left buttock about 4 cm. from the anal margin and posterior to the position of the left ischio-rectal space. At the mucocutaneous line in the left posterior quadrant was a hypertrophied papilla and a patent crypt into which a bent probe could be easily inserted. The temperature was 102° F. The patient was sent to the Worcester City Hospital.

Under spinal anesthesia an incision was made into the indurated area and a considerable amount of yellowish, creamy pus was evacuated. The resulting cavity did not penetrate deep into the ischio-rectal space, but extended posterior and lateral from it. A fistulous tract was discovered having its origin in the crypt mentioned above and extending laterally toward the cavity for 3 cm. There an encapsulated mass 6 cm. long and 2 cm. wide was found. Projecting from the medial end of this mass was the end of a chicken bone (Fig. 1). After the mass had been opened the bone was removed. It measured 5 cm. long, and one end was shaped like a harpoon. It was evidently the top part of the breast bone. The inside of the mass was glistening and reddish white. Orifices in the cavity were several tracts. These were opened up and the overlying tissue was removed, since it appeared to be very abnormal. At the top part of the encapsulated orifice was a passage into which a probe was

inserted. This probe proceeded outward for 3 cm. and then approached the surface. A stab wound was made in the skin and the probe reached the surface at this point.

The usual aftercare was carried out, and 6 weeks after the operation the cavity had closed and all the wounds had healed.

The patient denied having inserted any foreign body into the rectum and there was no apparent reason for doubting her story. On the other hand, she did not remember having swallowed a bone.

The discovery of foreign bodies in the rectum is not unusual. It has been pointed out that mode of entrance is more frequently from below than by way of the gastrointestinal tract. There are three things about this case that make it unusual: first, that it was possible for a person to swallow a chicken bone 5 cm. long and sharp at both ends and not be aware of the fact, secondly, that this object traversed the entire gastrointestinal tract, apparently without doing harm, and pierced the lower rectal and anal walls without discomfort to the host and thirdly, that the foreign body resided in an encapsulated cavity which failed to cause the slightest bit of trouble to the host until she fell and ruptured the capsule.

SUMMARY

The case is reported of an ingested chicken bone removed from the tissues of the left buttock. The bone traversed the entire gastrointestinal tract and pierced the rectum immediately above the mucocutaneous line. Six weeks after operation the wound had completely healed.

27 Elm Street.

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REPORT ON MEDICAL PROGRESS

PHYSIOLOGY*

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THREE publications merit mention as indications of progress in physiology. The first is the twentieth volume in the series of research publications of the Association for Research in Nervous and Mental Disease,¹ devoted this year to the hypothalamus and central levels of autonomic function. A large volume of nearly a thousand pages, it is divided almost equally into sections on anatomical, physiological and clinical studies. A very complete bibliography is included, as well as a short historical account by Fulton. Frohlich's original description of the adiposogenital syndrome is reprinted, it might have been made more accessible by translation into English. The second book is the short monograph by Barnes² entitled *Electrocardiographic Patterns*. Based on material presented at the meeting of the American Medical Association in 1937, it is notable for the careful correlation of electrocardiographic tracings, clinical history and pathologic findings. It exercises a valuable influence in insisting on the study and evaluation of all the various leads in the diagnosis of cardiac infarction, rather than dependence on some unusual lead of supposedly special virtue. The monograph is noteworthy for the clearness and good use of illustrations, and for the introduction in a later chapter of the subject of the electrocardiogram in pericarditis.

The *Selected Writings of Sir Charles Sherrington* issued under the editorship of Denny-Brown,³ is a particularly well-planned tribute to Sir Charles Sherrington. It outlines the history of his researches in the words of some of his most significant accomplishments, and represents in reality the history of an era in neurophysiology. Sherrington's pupils will find the volume an old friend, and will wish only that still more of the story could have been told, and many more excerpts included. To all physiologists and neurologists it will increase the availability of the writings of Sherrington, which constitute so much of the past and so much of the foundation for the future.

THE "RESPIRATORY CENTER"

It has been generally accepted that the rhythmic movements of respiration are initiated by the au-

tomatic activity of a bilateral group of cells lying in the medulla. These cells have been considered to act as a sort of pacemaker for respiratory activity in much the same fashion as the sinoauricular node acts as the pacemaker for the heart, and they are classically—and loosely—termed the "respiratory center." The work of Bronk and Ferguson⁴ indicates the general nature of this nervous discharge. Each contraction in an inspiratory or expiratory muscle is the result of a short burst of impulses in each motor unit, variations in depth of respiration are the result of variations in the frequency of discharge from the individual nerve cells, the duration of this discharge and the number of nerve cells in action. The discharge of impulses in expiratory and inspiratory neurones is under reciprocal control, so that the two alternate phasically. This discharge continues after the vagus nerves have been cut and phasic proprioceptive impulses have been interrupted by curarization. Gesell^{5,6} has shown that neurones in the medullary respiratory center originate this activity. He has summarized the evidence in support of the view that these neurones are spontaneously rhythmic, and are truly the pacemaker of the respiratory rhythm. Normal rhythmic activity continues after procedures that seem completely to deafferent the respiratory center, namely section of the vagus, deafferentation of cervical and cranial nerves or complete curarization, which stops phasic activity in the muscle proprioceptors. A very strong argument in favor of spontaneous rhythmicity of the respiratory center is the observation by Adrian and Buytendijk⁷ of slow rhythmic potential changes in the isolated brain stem of the goldfish, which closely parallel the respiratory rhythm in the intact fish.

There is, however, evidence that the origin of respiratory rhythm is not so simple as this, and it is furnished largely by recent review of the very interesting papers of Marckwald^{8,9} in 1887 and 1890. Stella¹⁰ and especially Pitts, Magoun and Ranson¹¹⁻¹³ deserve credit for calling attention to the significance of Marckwald's observations. The experimental evidence, in the essentials of which all these authors agree, may be stated briefly. There is, in the medulla, a bilateral group of cells over the inferior olive which controls inspiration

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Stimulation of this inspiratory center produces inspiratory effort, continuing as long as the stimulation is maintained. The animal may be killed by asphyxia by thus throwing it into a prolonged inspiratory spasm. Slightly above the center for inspiration is an expiratory center, where stimulation produces a maintained expiration. The decerebrate cat breathes practically normally, even when the vagi are cut. If the section of the brain stem is made at a somewhat lower level, namely just below the upper part of the tegmentum of the pons, but still well above the medullary respiratory center, the animal breathes normally so long as the vagi are intact. When the vagi are then cut, or blocked by cold, the animal goes into a prolonged inspiratory spasm. Although this inspiratory spasm ("apneusis") may occasionally be broken by short pauses, there is no appreciable expiration, and the animal dies from asphyxia.

From these experiments Pitts, Magoun and Ranson conclude that the medullary respiratory center is not spontaneously rhythmic, but if completely isolated from outside influence gives rise to a constant discharge from the inspiratory center, the intensity of which depends on the carbon-dioxide content of the arterial blood¹⁴, and that this constant discharge is periodically inhibited in one or both of two ways. Afferent impulses in the vagus, arising because of the stretch of the bronchi in inspiration,¹⁵ may serve to convert the constant into an intermittent discharge. There is also a center higher up the brain stem, presumably in the upper part of the tegmentum of the pons, which can do the same thing. Either the vagus or the pontine center may alone operate to render periodic the constant activity of the medullary respiratory center. The pontine center does not seem to be influenced reflexly, and it is still problematical how it operates to produce the periodicity it imposes on the primitive respiratory center. It may again be spontaneously rhythmic, and there is evidence from the work of Gasser that single nerve fibers may give rise to this type of periodic activity.¹⁶ On the other hand, Pitts, Magoun and Ranson decide on anatomical grounds that there is probably a reciprocal relation between the medullary inspiratory center and the pontine center, so that activity in the one inhibits the other, and vice versa, and a type of circus movement is set up which keeps the two centers in a state of alternating activity. Whatever the explanation, these experiments are of the greatest importance in calling renewed attention to the existence of a brain-stem center lying above the medulla, which must now logically be considered as an integral part of the "respiratory center."

THE ORIGIN OF PHASIC MOVEMENTS

An interesting counterpart of the work reported here on the rhythm of the respiratory center is found in recent papers by Smith Mettler and Culler.^{17, 18} These workers found that in the cat two types of response may be elicited by faradic stimulation of the cerebral cortex, a phasic and a tonic reaction. They report that the phasic type of response can be elicited only in an animal in which the dorsal roots as well as the ascending ventral spinocerebellar tracts are intact. When this afferent pathway is interrupted, stimulation of the cortex yields only a tonic or maintained contraction. They conclude that the stimulation of the cortex sets up a constant discharge from the neurones in the motor root unless it is periodically inhibited by impulses originating in the muscle proprioceptors.

This view, as the authors themselves point out, is at variance with evidence concerning other phasic movements. Sherrington^{19, 20} noticed in 1906 that the scratch reflex in the decerebrate or decapitate dog and cat proceeds even more briskly than normal after the limb has been deafferented. Graham Brown²¹ demonstrated that phasic running movements may be initiated in an isolated spinal segment that is completely deafferented. It is, of course, a matter of observation that phasic movements may be executed by the tabetic limb, and monkeys execute phasic movements with hind limbs that have been deprived of sensation by appropriate section of the dorsal roots.

MUSCLE HEMOGLOBIN

A review by Millikan²² on muscle hemoglobin calls attention to an important phase of respiration not always sufficiently emphasized. This substance, closely related to the hemoglobin in blood is partly responsible for the red color of muscles, and differences in its concentration are responsible for the difference between "pale" and "red" muscles. It has been known for some time that distinct differences in physiologic behavior are associated with the difference in color of the muscle. Red muscles operate more slowly, maintain contractions over longer periods with less fatigue than do pale muscles, and have a slower time of reaction. Examples of red muscles are the heart muscle of large mammals, the wing muscles of large flying birds and the leg muscles of running animals, such as the horse and the dog. Muscles which contract more frequently have less hemoglobin and are pale. An extreme example is the wing muscle in flying insects, which may contract as often as three hundred times per second. The hearts of small birds and small mammals,

such as mice, also contain smaller quantities of hemoglobin. Some muscles, such as the heart and leg muscles of the frog, contain no muscle hemoglobin. In the cat, one of the muscles of the calf (soleus) is red while the other (gastrocnemius) is pale. The twitch of the soleus muscle is more prolonged, it gives a more smoothly fused tetanus, full tetanus is maintained with fewer impulses per second, and it fatigues less readily. It is therefore fitted for economical maintenance of tension over long periods of time, as in standing. The gastrocnemius muscle, on the other hand, gives a shorter but more vigorous twitch, and is consequently adapted for short acting but strenuous activity, such as running. The same muscle may show a gain in muscle hemoglobin following increased activity.

The concentration of muscle hemoglobin is much less than that of hemoglobin in the blood. Thus the maximum concentration of muscle hemoglobin in the heart of the dog is nearly 500 mg per 100 gm of tissue, while the concentration in the blood may be as high as 18,200 mg per 100 gm. The total oxygen capacity of all the muscle hemoglobin in a man has been calculated at 345 cc, while the blood could hold 1160 cc.²³ Millikan has calculated that in the normal dog's heart the amount of oxygen available in combination with muscle hemoglobin would be used up in about seven seconds of normal activity, or in less than a second of extreme activity. The substance is obviously therefore able to act only as a short-time source of oxygen.

The properties of muscle hemoglobin favor its storage function. It has a greater affinity for oxygen than has blood hemoglobin, so that, even at the venous end of the capillaries, stores of muscle hemoglobin will be full while the blood will be seriously depleted of oxygen. On the other hand, it appears that the cell oxidase systems can on their part operate at a still lower oxygen tension, and in turn deplete the oxygen stored in muscle hemoglobin.

The ability of muscle hemoglobin to store oxygen and deliver it to the cells at a later time seems now to explain the unusual ability of some animals to dive for prolonged periods. Men and other non-diving mammals can hold their breath for only a minute or so if respiration is shut off without any preparation. Here the limiting factor is probably the accumulation of carbon dioxide. When the breath is held after a period of forced breathing, respiration can be suspended for as much as five minutes or slightly longer. The limiting factor is the oxygen capacity of the body, and it can be calculated that the breath can be held

only as long as it takes to use up the oxygen in the blood, tissue fluids, lungs and muscle hemoglobin. If the lungs are filled with pure oxygen after forced breathing, three or four liters more of oxygen are made available, and some experimenters have been able to hold their breaths for as long as fifteen minutes.

These are relatively short periods when compared with times for diving mammals. Some whales may remain submerged for two hours, and seals, muskrats and beavers regularly make dives of fifteen minutes. It must also be remembered that they do not remain at rest, but may show considerable activity. At least one clue to this behavior is the discovery by Robinson²⁴ that the muscle of the seal contains eight to ten times as much muscle hemoglobin as is found in the muscle of non-diving mammals. Irving²⁵ has discussed the other mechanisms that may also operate to facilitate endurance while diving.

Millikan's work makes necessary a reconsideration of the generally accepted views concerning the chemistry of muscular contraction. These hold that the energy for muscular contraction is derived principally from the anaerobic breakdown of certain substances found in muscle, and that during rest these compounds are resynthesized, with energy derived from oxidation. The process may be likened to a storage battery, which provides a readily available source of energy, but must be recharged between periods of use. Three separate anaerobic reaction systems have been postulated as the source of the energy for contraction. The first of these was the breakdown of glycogen to lactic acid. Later Lundsgaard²⁶ showed that contraction still occurred after the breakdown of glycogen to lactic acid was prevented by poisoning the muscle with iodoacetic acid, and proposed the hydrolysis of phosphocreatine as the source of the energy. Still later the hydrolysis of adenosine triphosphate was suggested as the primary process. In recent years Sacks and Sacks²⁷ have brought forward certain objections to the theory of anaerobic mechanisms, and have proposed that the fundamental reactions in contracting muscle are oxidative and not anaerobic, and that anaerobic reactions take place only when the oxygen supply is inadequate to support a fully aerobic metabolism. Their arguments are based largely on the time required to resynthesize the precursors of the anaerobic metabolites. Naturally, the rate of resynthesis of these substances must be rapid enough so that it can account for their nonappearance during light exercise with an adequate oxygen supply. Actually, the lactic acid cycle does not meet these requirements, and in fact a muscle

with an intact blood supply does not resynthesize lactic acid at all, but lets it escape into the circulation to be resynthesized in the liver or the heart. Sacks²⁷ has recently demonstrated that oxidative resynthesis of the other two substances does not proceed fast enough to permit the establishment of the steady state."

Millikan has now been able to show that muscle hemoglobin begins to give up its oxygen within a fifth of a second after the onset of tetanic contraction, and fully regains it in a few seconds after cessation of the contraction in the presence of an adequate blood flow. This rapid utilization of oxygen seems to account for the greater part of the total oxygen demands of the contraction. Millikan concludes

The acceptance of these results does not necessarily mean the abandonment of the classical theory of anaerobic contraction and oxidation recovery. It does, however, mean something nearly as catastrophic, namely that none of the reactions of anaerobic muscle biochemistry seem to be of much importance for aerobic activity. The theory that a direct oxidative process provides the energy for contraction was proposed by Sacks in 1932. Since the ability of muscles to operate for a time anaerobically is unquestioned this hypothesis requires a dual mechanism, one, a normal aerobic quick, efficient mechanism the other an emergency oxygen-debt mechanism, presumably of lower efficiency called into action when there is an oxygen lack. In terms of the well known analogy the muscle can run off its batteries if it has to charging them up afterwards, but it prefers to operate by direct drive if it can.

HEPARIN

The monograph on heparin by Jorpes²⁸ calls attention to renewed interest in a substance that has been known as a potent anticoagulating agent since its discovery by Howell in 1916, but which has only recently been made available for extensive study by the improved methods of recovery developed by Charles and Scott and cited by Best.²⁹ Named heparin because of its abundant occurrence in the liver, it is now known to be present throughout the body. It unites in vitro and in vivo with highly basic dyes, especially toluidine blue. With this dye it gives a strong purple stain in vivo, and the dye can therefore be used to stain histological preparations and detect its presence. This technique shows that heparin is present in large quantities in the mast cells of Ehrlich, and it is presumed that these cells secrete the material into the blood stream. This possibility seems strengthened by the position of the mast cells around the capillaries and small nonmuscular blood vessels.

The anticoagulating activity of the most recent crystalline compounds is about 100 units per milligram, that is, 1 mg. will protect 100 cc. of blood from coagulation for twenty four hours. In man

1 mg. per kilogram of body weight will prolong the coagulation time to twenty or thirty minutes. There is still some question about the harmlessness of the substance. In dogs it has been difficult to detect any harmful effects, even when administered in large quantities over several days. In man it has been used extensively, with few untoward results, but there are some reports of arterial hemorrhages following its use.

The mechanism of the action of heparin is still disputed.³⁰ Howell's original conclusion was that it prevented the activation of prothrombin, but there are some workers who claim that it prevents the reaction between thrombin and fibrinogen.³¹ Wherever it may function, there seems to be general agreement that it acts because of its high electronegative charge. This view is supported by the discovery of anticoagulant activity in other compounds of great molecular weight possessing high ionic charges.

Heparin has not yet been assigned any definite function in the normal organism, although the situation of the mast cells suggests that it may act to prevent thrombus formation in the small vessels. It may also operate to maintain the fluidity of other body fluids. The liberation of heparin into the blood stream in peptone shock in dogs has been shown to cause the increased coagulation time in this condition.

Clinically heparin has been used in a variety of conditions, obviously its employment has been at times injudicious, especially when the not too remote possibility of arterial hemorrhage has not been kept in mind. There is, however, an obvious reason for its employment in diseases complicated by thrombosis. Here the damage caused by the lesion responsible for the thrombus formation may be relatively unimportant, while the real damage is done by growth of the thrombus or by embolism. Some of these circumstances are reviewed by Jorpes and by Best.²⁹ More recently Kelson and White³² have reported successful treatment of subacute bacterial endocarditis by the combined use of heparin and sulfapyridine. The definite possibility of cerebral hemorrhage³³ cannot be considered a contraindication to this treatment in a disease that has previously been invariably fatal.

THE CARDIOVASCULAR SYSTEM

An excellent paper by Blumgart, Schlesinger, and Davis³⁴ contributes basically to the anatomy, physiology and pathology of the coronary circulation and presents a unified concept of the clinical manifestations of inadequate cardiac circulation. Extending the earlier observations from the same laboratory this paper arrives at the following con-

clusions In normal hearts the coronary arteries are anatomically and physiologically end arteries While smaller vessels have rich anastomoses with one another, as shown by the ready passage of watery injection materials from one coronary artery to another, the failure of mixing when more viscous injection masses are employed demonstrates the absence of anastomoses of a diameter of 40 microns or greater There is no development of anastomoses with age, in the absence of disease of the coronary arteries Obstruction to normal coronary arterial blood flow by narrowing or occlusion results regularly in the development of intercoronary anastomoses measuring 40 to 200 microns in diameter These anastomoses may compensate so well for the deficiency in coronary supply that the circulation remains adequate for ordinary activities, and no signs of necrosis or infarction can be found Myocardial infarction results from a disproportion between the demand for blood and its supply It may be produced by an excessive demand for blood in the presence of a reduced supply adequate for normal demands, or may follow reduction of blood supply below even minimal demands The absolute necessity for immediate and complete bed rest, sedation, reduction of excessively high heart rate and other measures designed to reduce the work of the heart in coronary occlusion is emphasized as a measure that may very possibly limit greatly the extent of myocardial necrosis, or even prevent its development Lack of oxygen supply to the myocardium may develop following causes other than narrowing or occlusion of the coronary vessels, for example fall in blood pressure, as in shock, and lack of oxygen-carrying capacity of the blood, as in anemia These factors must be closely watched in patients whose coronary insufficiency renders them more than usually vulnerable to oxygen lack In addition to these and other very important considerations, the paper raises a great many questions to be answered only by future work The mechanism of development of the arterial anastomoses and the rate at which they become established are important points about which the authors will no doubt have more to say in later communications

The fertile suggestions of Goldblatt continue to dominate the study of renal hypertension, and much new work has been reported Katz and Steinitz³⁵ have shown, by the elegant technic perfected by Hamilton, Woodbury and Vogt,³⁶ that renal hypertension in dogs is not accompanied by changes of the pressure in the pulmonary circulation Rodbard,³⁷ working in Katz's laboratory, has shown by the ingenious procedure of anastomosis of the ureter to the lumbar vein that the nor-

mal kidney does not prevent hypertension by excreting the hypertensive substance liberated by an ischemic kidney, but antagonizes its action by virtue of its own metabolic activity He suggests that the kidney destroys the pressor substance, but another equally possible hypothesis seems supported by two other reports Harrison, Grollman, and Williams³⁸ and Page and Helmer³⁹ present evidence that the normal kidney secretes a substance which does not by itself alter the normal blood pressure, but will lower the pressure in renal hypertension and antagonize the action of pressor substances obtained from the kidney MacLachlan and Taylor⁴⁰ have studied the suggestion that the hypertension which follows renal ischemia is an adaptive mechanism in which the kidney controls its blood flow in accordance with functional demands They have been able to show that an animal with mild hypertension produced by placing one kidney in a cast and removing the other responds to an increased protein intake in the diet by an increase in its blood pressure and by an exacerbation of hypertensive symptoms

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26231

PRESENTATION OF CASE

First Admission A thirty-eight-year-old building inspector was admitted to the hospital complaining of dyspnea on exertion of nine weeks' duration.

Three years before this first admission (twelve years before his death) two teeth became "infected" and the joints of both ankles and knees became exquisitely tender to pressure and motion. All his teeth were removed and a few weeks later his illness cleared, but complete recovery required six months. He was well until about nine weeks before his first admission, when he suddenly became dyspneic and felt exhausted while climbing three flights of stairs to his home. He ate supper and immediately noted a feeling of great epigastric distention. He went to bed and fell asleep. Three hours later he awoke with a knifelike pain in the epigastrium over an area measuring 8 to 10 cm. After about two hours the pain shifted to the lower abdomen and radiated to the right groin and right testicle but disappeared in about six hours. A physician gave him digitalis. A second identical attack occurred three weeks later. A third attack occurred two days before admission, and he vomited every two hours for about twenty-four hours. The vomitus was clear and had no taste. There were no other symptoms. A tonsillectomy and adenoidectomy were performed three weeks before admission.

The family, marital and past histories were non-contributory.

The physical examination revealed a well-developed and slightly obese man propped up in bed in moderate respiratory distress. The skin was warm and dry and showed numerous telangiectatic spots scattered over the abdomen and trunk. No definite petechiae were seen. The scleras were clear. He was pale with slight cyanosis and a cyanotic flush over the cheeks. The throat was injected, and the tonsils were absent. The chest showed a prominence of the left side, and a precordial impulse was definitely visible in the axilla. The apex of the heart was definitely enlarged toward the left in the anterior axillary line, and there was slight enlargement toward the right with some widening of the supracardiac dullness. The rate was

rapid, absolutely irregular, with a pulse deficit which prevented accurate timing of murmurs. The force of the beat varied in intensity. The first heart sound was partially obliterated by a rough, short presystolic and a systolic apical murmur. The second sound was reduplicated and clicking, but there were no murmurs at the pulmonic or aortic areas. The peripheral vessels were negative to palpation. The blood pressure was 160 to 120 systolic, 105 to 70 diastolic. The lungs showed many moist rales at both bases, especially the left, but the breath sounds were otherwise normal. The remainder of the examination was negative.

The temperature was 100.2°F, the pulse at the apex 140 and at the wrist 86. The respirations were 25.

Examination of the blood showed a red-cell count of 4,600,000 with a hemoglobin of 70 per cent (Sahli), and a white-cell count of 20,800 with 85 per cent polymorphonuclears, the smear was normal. Urine examinations showed + albumin, 35 to "rare" red blood cells and 10 to 5 white blood cells per high power field in the sediment, with occasional granular and hyaline casts. The stools were negative. The blood Hinton and Wassermann tests were negative. The serum non-protein nitrogen was 33 mg per 100 cc.

The patient was digitalized, though it was stated that he did not respond in the "usual way" in that the ventricular rate was difficult to control. With bed rest and supportive care, the temperature fell to normal on the fifth day. There was a slight pulse deficit, but otherwise he seemed improved and was discharged on the fifteenth hospital day.

Second Admission (five years later) Following discharge the patient was well and active until six months before his second hospital admission when he developed recurrent furuncles and abscesses involving the neck and buttocks.

Physical examination now showed a soft blowing diastolic murmur along the left sternal border in addition to the other findings noted above. Except for a white-cell count of 14,000, the laboratory findings were normal. A sugar-tolerance test was normal. He was discharged on the seventh day after dermatological therapy.

Third Admission (six weeks later) He was admitted for treatment of a rectal fissure which was successfully excised without complications.

Fourth Admission (fifteen months later) The patient entered with a "respiratory infection." Sticky rales were heard over the left lower chest, but no heart failure signs were elicited. With bed rest, a slightly elevated temperature fell to normal, and he was discharged after one week's stay in the hospital.

Final Admission (three years later, twelve years after the onset of his first symptom) Seven months before this admission, the patient noted the sudden onset of severe right costovertebral pain, which radiated to the right groin and to the right testicle. The pain was severe and associated with nausea and vomiting, it was of a cramplike or stabbing nature and remained almost constant for two days and then gradually disappeared, with some residual soreness. There was no dysuria or hematuria. Following this episode the patient was well until the day before admission, when he again had the onset of severe right flank pain. At this time it remained high and did not radiate to the testicle. The pain was again stabbing, severe, and associated with nausea and vomiting. It was almost constant until he was given a hypodermic injection for relief. He was then admitted to the hospital for study.

Physical examination revealed a well-developed and well-nourished plethoric man complaining of spasms of right flank pain referred to the suprapubic regions. The heart apex was seen and percussed at a level 4 cm. beyond the midclavicular line in the fifth interspace. The rhythm was totally irregular, but there was no pulse deficit. There was a rough systolic murmur at the apex with a loud, late, long, presystolic murmur also at the apex. A rough low pitched systolic murmur was heard at the aortic area, and a moderately loud blowing diastolic murmur was present along the left sternal border. The pulmonic second sound was much louder than the aortic second sound. No thrills were felt. The blood pressure was 166 to 120 systolic, 80 diastolic. There was no evidence of congestive failure. Tenderness was elicited in the right costovertebral angle with protective muscular spasm. There appeared to be slight tenderness over the course of the ureter to a point just above the pelvic brim. The spleen and liver were not palpable.

Examination of the blood showed a red-cell count of 5,400,000 with a hemoglobin of 15 gm (photoelectric-cell technic) and a white-cell count of 9800 with 77 per cent polymorphonuclears. Examination of the urine showed albumin which varied from ++ to ++++. The urine contained normally up to 1022. The sediment of all the specimens contained a few red blood cells. The nonprotein nitrogen was 65 mg per 100 cc. Intravenous pyelograms on the sixth hospital day showed no evidence of excretion of the dye on either side. A barium enema was negative.

On the eighth hospital day he was awakened by pain poorly localized under the left ribs and in the left upper quadrant. It was cramplike

in character and seemed to be related to gas. Palpation revealed no unusual masses or tenderness. No friction rubs were heard. Two hours later his condition became rapidly worse, the outstanding signs were those of peripheral shock. He was cold and sweaty. The blood pressure rose temporarily to 220 systolic, 80 diastolic and later subsided to its previous level. Numerous medium rales appeared over the upper chest on both sides, most prominent below the clavicles. There were slight impairment of resonance, and increased tactile fremitus and whispered voice. The lung bases remained relatively clear. In spite of the abrupt appearance of these signs in the lungs, there was no wheezing, cough or hemoptysis, no pain, and no obvious air hunger or cervical vein engorgement. The pulmonary second sound remained unchanged (moderately accentuated). A portable film of the chest showed that both upper lobes of the lungs contained a diffuse, symmetrical, mottled density extending to the apex and ending rather abruptly in the mid lung field. The lower lobes were clear. The right lower lobes seemed more radiant than usual. The heart was prominent in the region of the left ventricle. There was no fluid in the pleural cavity. The white-cell count rose to 26,000. No acid-fast bacilli were found in the sputum. No new abdominal symptoms or signs appeared, but he continued to complain of rather diffuse abdominal discomfort and distention. There was no peripheral edema. The temperature rose to 101 and later to 102.8°F on the succeeding two days. The heart action increased to 120, and increasing amounts of digitalis failed to control it. Mercury resulted in an output of 600 cc in twenty-four hours. A second x-ray film showed some clearing in the left upper lobe, but there was no definite increase in the right mid lung field and right lower lobe. A shadow in the right mid lung field had the appearance of consolidation, whereas all the remaining shadows were consistent with edema.

He failed to respond, continued in peripheral shock, a gallop rhythm appeared the respirations became shallow, the blood pressure dropped to 100 systolic, 80 diastolic, and the breath seemed slightly urinous. He quickly failed and died on the eleventh hospital day, three days after the onset of the terminal acute illness.

DIFFERENTIAL DIAGNOSIS

DR. PAUL D. WHITE "Three years before this first admission two teeth became infected and the joints of both ankles and knees became exquisitely tender to pressure and motion. All his

teeth were removed and a few weeks later his illness cleared, but complete recovery required six months." That sounds like past history, unless we assume that he was not well during that period, he may of course have had active rheumatism all through these three years. Thus it is a question whether this is the beginning of the present illness or whether it is past history. This sickness appears to have been rheumatic fever, probably his first rheumatic infection coming on at the age of thirty-five. Possibly it was rheumatoid arthritis, but in view of what is found later the more plausible interpretation is rheumatic fever.

There is no statement as to why his tonsils and adenoids were taken out. Evidently the tonsils were large and infected and were removed largely because of the presence of rheumatic heart disease.

Then we come to the first acute episode. He suddenly became dyspneic and exhausted. The physician who gave digitalis must have found something wrong with his heart. Dyspnea alone does not demand digitalis right away. It is likely that he developed tachycardia at the time he climbed three flights of stairs and that may have produced the dyspnea, tachycardia is produced in that way very frequently in a person with rheumatic heart disease. It was probably the onset of auricular fibrillation with rapid rate induced by effort. However, that is simply speculation at the moment. The dyspnea apparently subsided and he went to bed and fell asleep. Then came the severe, knifelike pain in the epigastrium which at first remained in that position and then shifted in a way absolutely characteristic of renal and ureteral colic because of the distribution of the pain to the right groin and testicle. Subsequent attacks occurred and each subsided quite quickly. The history does not reveal his state of health between the attacks. We may assume it was quite good and that these were isolated attacks—at intervals of three weeks first, and then of six weeks. The attacks were like renal colic, which is usually due to stones or gravel, but may possibly be ascribed to infarction from embolism.

The question that intrigues me most is the possibility of embolism producing such characteristic renal colic. I have not heard of its doing so, that is embolism to the kidney secondary to the occurrence of auricular fibrillation in the presence of heart disease and intracardiac thrombosis. It is very uncommon for the discomfort in such cases to radiate as far as the right testicle. However, we must entertain the possibility.

He was dyspneic at the time of the third attack, as he was just prior to the first attack of pain. Dyspnea may have accompanied each attack and

may even have been present between attacks.

There was no statement of clubbing of the fingers.

The findings on physical examination suggest that the heart disease was of long standing. The left side of the thorax was prominent and probably had been since childhood, though there is no proof of it. We frequently see precordial thoracic bulging in the children's clinic in youngsters with big hearts due to congenital defects or to rheumatism developing in early life. There was definite cardiac enlargement. The heart may be pushed over, but if it were simply displaced the apex would be high in position and not so low as here.

We wonder whether the heart rate had been rapid right along or whether the tachycardia came only with these attacks. It is unusual to have presystolic murmurs in the presence of auricular fibrillation. The murmur may have been only mid-diastolic, or we might question its presence altogether. On the basis of these findings we have probable confirmation of the diagnosis of rheumatic heart disease with mitral stenosis, auricular fibrillation and pulmonary congestion, not necessarily due to failure but rather to the tachycardia. The heart rate was so rapid that adequate auscultation could not be carried out at that time.

Apparently there was no abdominal (or flank) tenderness, which would help to rule out a surgical abdominal emergency in this case, since he was quite alert at the time of the examination.

This man had moderate fever. It is not our experience that fever, even as little as this, is produced by congestive failure alone. There is almost always some other factor, an active infection somewhere, or infarction. There might conceivably be renal or ureteral infection due to stone, or renal infarction, or recurrent active rheumatism in a man who has had previous attacks, any of these conditions, especially active rheumatism, may precipitate auricular fibrillation, as well as cause fever.

The white-cell count was higher than we would expect from anything but moderately severe infection, or marked infarction, it was distinctly higher than we usually find with myocardial infarction or with small pulmonary infarcts.

The red and white blood cells in the urine are probably not to be explained by congestion alone. They are in keeping with renal stone or other renal disease, including infarction.

The patient was digitalized, though it was stated that he did not respond in the usual way to digitalis doses in that the ventricular rate was difficult to control. It is common to have difficulty in

controlling the ventricular rate in congestive failure in the presence of infection or infarction. A third cause for such difficulty is thyrotoxicosis of which there is no evidence here. He probably had spontaneous recovery from this acute episode. Then, I judge, the heart rate came down, because there is only a slight pulse deficit recorded there after. The symptoms cleared, but doubtless he still had the auricular fibrillation.

Were there any x rays of the chest, kidneys, or ureters taken at the time? Is that a permissible question for me to ask?

DR. HOWARD B. SPRAGUE: There were no x rays taken at that time.

DR. WHITE: Any blood cultures?

DR. SPRAGUE: No. His apex rate was 75 at discharge, and the temperature was normal.

DR. WHITE: Was the pulse still irregular at discharge?

DR. SPRAGUE: Yes.

DR. WHITE: He did well apparently after this illness. There is no note of anything more until six months before his re-entry to the hospital which in a chronic rheumatic heart patient might mean that the chronic auricular fibrillation was well controlled.

Was he continued on digitalis over that period of time?

DR. SPRAGUE: Yes.

DR. WHITE: Had the presystolic murmur become mid-diastolic at this time?

DR. SPRAGUE: It was a definite diastolic murmur at the apex.

DR. WHITE: The soft blowing diastolic murmur at the left sternal border would make one think of the probability of aortic regurgitation as an additional valve lesion.

DR. SPRAGUE: That murmur was first noted in December, 1935.

DR. WHITE: What is the time relation of that to this report?

DR. SPRAGUE: The second admission was in April, 1936. Apparently it appeared between June 1935, and December, 1935, during which time he had gone through a period of severe carbuncles in his neck, and I noted the murmur at that time.

DR. WHITE: The heart examination would indicate the presence of mitral and aortic regurgitation, probably stenosis of both valves, though more of the mitral valve. There is one other possibility than that this aortic regurgitation had developed as a sequence to recurrent rheumatism, and that is, that syphilis may have come in, despite the earlier negative Hinton reaction resulting in both rheumatic and syphilitic valvular disease, although we do not often see that combination.

Were there new serological tests at the time, Hinton or Wassermann reactions?

DR. SPRAGUE: I think not. I do not think syphilis was a possibility.

DR. WHITE: I suspect it is not probable, but it has to be thought of.

Assuming that the technic was correct, the intravenous pyelogram showing no evidence of excretion of dye on either side, would mean that there was a good deal of kidney damage with inability to concentrate, a bad renal state, probably from many years of renal involvement.

"No friction rubs were heard. They were thinking of pleurisy due to pulmonary embolism and infarction."

"The blood pressure rose temporarily to 220 systolic, 80 diastolic." Very frequently the blood pressure in an acute episode goes up under the influence of pain or other exciting factor even including coronary thrombosis. I have seen it higher than normal in such cases before it settles back or finally becomes quite low, a low pressure is sometimes due to rest in bed for a long period of time rather than necessarily to a state of shock or heart failure.

In spite of the abrupt appearance of these signs in the lungs, there was no wheezing cough or hemoptysis, no pain, and no obvious air hunger or cervical vein engorgement." That statement does not rule out multiple pulmonary emboli. One can have embolism in the lung without any symptoms. One can have any kind of symptoms and very little in the way of signs.

Our patient had a barium enema, two chest x-ray examinations and an intravenous pyelogram. The barium enema showed nothing abnormal. A considerable portion of the terminal ileum was normal. Why was the barium enema done?

DR. SPRAGUE: The barium enema was done because the abdominal pain did not localize on one side, went from right to left, and in the past he had attacks of abdominal pain of a vague nature with some diarrhea relieved by belladonna, and the question arose as to whether he had a lesion of the large bowel.

DR. AUBREY O. HAMPTON: The first of these chest plates that we have is the best one and shows a grossly enlarged heart. Even though this is a portable film there is as much enlargement downward as to the left. This density in the lungs is almost exactly symmetrical, and it does end rather abruptly at the middle of the lung field. The right lower lobe is more radiant than the left chiefly because the heart shadow is large on that side. He has one line at the dome of the diaphragm that was not described. It could be an

old scar from infarction or infection. In the films taken the following day I think you can see a fairly definite change in the chest. The left upper lobe and even perhaps the right upper lobe look clearer than before. The right lower lobe now presents the same density as the remainder of the abnormal portion of the lung. This shadow of the right border of the heart was the one assumed to be something different from the remaining shadows, but it could be dilated blood vessels superimposed upon the same general condition. It is not sharp in outline and has no really characteristic shape.

DR. WHITE: May I ask if in cases of large heart it is conceivable that there may be some unusual pressure in the lower pulmonary vessels to limit the entrance of emboli? Has it been the finding that in rare cases emboli may go only to the apices?

DR. HAMPTON: I do not think we have seen pulmonary infarction produce this picture. We have seen this picture associated with small infarcts, but this lesion is almost wholly confined to the upper lobe and it certainly would be unusual for infarction.

The intravenous pyelogram is not satisfactory from the standpoint of viewing the kidney outlines, but I think that if dye had been excreted you would have been able to see it, particularly in the bladder. The bladder contains no dye after forty minutes. It contains urine. We can say that it is normal in size.

DR. WHITE: He evidently died in shock with failure of the kidneys, heart, and lungs, but not really a great deal of heart failure. I am very much intrigued, though I probably am wrong, by the appearance of the lungs in the x-ray picture and the prominent involvement of the upper lobes; infarction can happen but is less common certainly, according to the paper by Hampton and Castleman,¹ in the upper lobes and right middle lobe. Seventy-four per cent was their figure for the location of pulmonary infarcts in the lower lobes.

DR. HAMPTON: When we found infarcts in the upper lobes we almost invariably found them in the lower lobes also.

DR. WHITE: That is the most interesting and puzzling part of the whole case, the findings in the upper lobes; infarction alone would hardly seem likely. There has also been a change in the pictures, and one would think therefore that it has not been wholly a chronic state. Bronchopneumonia would hardly seem likely to involve both upper lobes in this way, nor would tumor. Tuberculosis might, but this is not the picture of tuberculosis.

Was there any electrocardiogram?

DR. SPRAGUE: Not in the hospital records. The others were not helpful.

DR. WHITE: The best I can do is to diagnose rheumatic heart disease, probably acute as well as chronic, probably recurrent, perhaps existing all this time in a mild degree. There are some cases of long-standing rheumatic involvement—ten years or more in adults. There was in this case rheumatic involvement of both aortic and mitral valves in all probability, with less likely syphilitic aortic involvement. The heart was undoubtedly big with auricular fibrillation, on the edge of failure, and yet with very little actual congestive failure that I can find. The involvement of the lungs I first labeled pulmonary infarction with edema and terminal infection, I am now wondering if a rheumatic involvement of the lungs could account for it, a rheumatic pneumonitis, but I am not familiar with its limitation to the upper lobes. Renal calculi should be found, or extensive renal infarction, but more probably calculi, with extensive damage to the kidneys. There may have been coronary thrombosis, subacute bacterial endocarditis, pericarditis, or disease of the aorta such as dissecting aneurysm, but the evidence does not support these diagnoses.

DR. J. H. MEANS: I should like to ask Dr. Sullivan if he recalls Dr. A. Thornton Scott's findings on the distribution of edema in the lungs in cases of Bright's disease.

I recall being very much surprised, a few days ago at our Medical Grand Rounds, when Dr. Schatzki showed a film with haziness in the middle portions and apices of both lung fields, but with perfectly clear bases, and said that it looked like edema. I had supposed that edema would be most marked at the bases and least marked at the apices.

DR. EUGENE SULLIVAN: I do not recall the exact figures, but there were some cases where the pulmonary edema was not at the base, but higher up.

DR. EDWARD F. BLAND: I went over the cases with Dr. Scott, and one or two showed predominant involvement in the upper lobes. The pictures were striking and cleared rather rapidly in some cases.

DR. MEANS: Something rather like this?

DR. BLAND: Surprisingly like this.

DR. HAMPTON: A similar picture occurs in heart disease alone. I remember one case we had here some time ago with a picture quite similar to this, and it proved to be rheumatic heart disease and nothing else.

DR. SULLIVAN: One case was verified at autopsy with edema in the upper lung fields.

DR. T. DUCKETT JONES: I think what Dr. White

said about long standing rheumatic fever and in creasing heart failure for years is obvious, but how this terminal feature could be associated is difficult for me to understand. The picture and clinical story are not that of rheumatic pneumonitis. Even as vague as the syndrome is, the patient with rheumatic pneumonitis is seriously ill before symptoms appear. The majority of them would have changes detectable by x ray study and would have changes in the lower lobes. I should say it seems unlikely that it is a straight pneumonitis.

Dr. WHITE: The renal condition could be the last straw.

Dr. JONES: It would have to tie up with this. You have to have something comparable to block- ing off of the renal artery to explain the picture. I wonder if we could not mention a second diag- nosis of rheumatic heart disease and hyperneph- roma which would produce pulmonary metastases.

CLINICAL DIAGNOSES

Chronic rheumatic heart disease
Mitral stenosis and regurgitation
Aortic regurgitation
Congestive failure.
Auricular fibrillation
Pulmonary edema.
Acute rheumatic fever and pneumonitis?
Nephritis (? cause)
Uremia.

Dr. WHITE'S DIAGNOSES

Rheumatic heart disease, acute and chronic.
Mitral and aortic stenosis and regurgitation
Marked cardiac enlargement.
Auricular fibrillation
Congestive failure.
Pulmonary infarction, infection or edema (or combination thereof)
Renal and ureteral calculi or renal infarction.

ANATOMICAL DIAGNOSES

Rheumatic heart disease, acute and chronic, with mitral and aortic stenosis.
Endocarditis, acute rheumatic, mitral and aortic valves.
Pericarditis, acute
Mural thrombus, left auricular appendage
Thrombosis of lower abdominal aorta with oc- clusion of common iliac vessels, lower aorta, left renal artery and superior mesenteric artery, acute.
Infarction of left kidney, acute.
Infarction of small bowel early
Pulmonary congestion and edema both upper lobes.
Rheumatic pneumonitis?

Cardiac hypertrophy, involving the right ven- tricle and left auricle.

Hydrothorax, bilateral, slight.

Chronic passive congestion of liver and spleen

Renal infarcts, healed, bilateral.

Cholelithiasis.

PATHOLOGICAL DISCUSSION

Dr. TRACY B. MALLORY: The underlying process, of course, was rheumatic heart disease. There was a greatly enlarged heart, 650 gm., and there was involvement of both mitral and aortic valves. There was a marked degree of stenosis in the mitral valve, a significant degree of stenosis and also regurgitation in the aortic. A few small fresh rheumatic vegetations were present and there was also an acute pericarditis. The coronary ar- teries were negative. The hypertrophy was pres- ent on both sides of the heart but more marked on the left. The lungs were rather large, very heavy, obviously edematous. On gross examina- tion slight but poorly outlined areas of consoli- dation seemed palpable in the upper lobes. On microscopic examination there was no very con- vincting pneumonia. There was a somewhat patchy edema, quite a little atelectasis, occasional al- veoli containing some fibrin and a few fibro- blasts attempting to organize it, but no leuko- cytic infiltration. There were no fibrous plugs in the bronchi or the respiratory bronchioles such as Masson, Ruopelle and Martin² have described in rheumatic cases, and no very extensive lobular alveolar hemorrhage such as we have seen in acute rheumatic cases. I certainly could not re- cognize it as rheumatic pneumonia and I doubt if it is, but I am too vague as to what the lesion is in that condition to be dogmatic. The ter- minal event unquestionably was a series of emboli. The main branch of the left renal artery was plugged by a fresh embolus, and small fresh emboli were found in the small branches of the right kidney. There also were scars of old in- farction in both kidneys. The renal embolism must have gone back many years, and I think, in retrospect, accounts for the early attacks of pain with radiation to the testicle.

Dr. WHITE: Were there any stones?

Dr. MALLORY: No. There were two more im- portant emboli which probably precipitated death. One was to the superior mesenteric artery which was completely plugged, although the bowel had not become gangrenous. The other was a rider embolus of the aorta blocking both iliac arteries.

Dr. WHITE: I called up a urologist to inquire whether typical renal colic with radiation to the testicle could be caused by renal infarction and he said he did not think so.

DR MALLORY Either you did not call the right urologist or his memory is short, because in this hospital they have explored patients for renal calculi and found infarction

A PHYSICIAN Were there any renal emboli and infarcts?

DR MALLORY There were a few

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CASE 26232

PRESENTATION OF CASE

A fifty-six-year-old Japanese cook was admitted to the hospital complaining of dyspnea on exertion

The patient had always been in robust health and had taken pride in his physical prowess as a wrestler and swimmer. He was thus active athletically until approximately two years before admission, when he began to tire easily. For several months before entry he noticed gradually progressing dyspnea on exertion. One month before admission he had had a bad cold, and an examination at that time by his physician revealed that his blood pressure was 130 systolic. The cold improved slowly and he seemed fairly well until the evening before entry when, immediately after supper, he experienced the sudden onset of dyspnea (without exertion), substernal oppression, but no pain or other discomfort anywhere. He opened a nearby door in an attempt to obtain more air, took soda and salt water without relief, coughed slightly, and raised moderate amounts of white frothy sputum. A physician who was called found the patient coughing and wheezing. He appeared ill and had a blood pressure of 156 systolic, 70 diastolic. He denied ever having had asthma or a similar attack before. A quarter grain of morphine sulfate was administered hypodermically, and the patient slept the night through, sitting erect. At 6 a m on the morning of admission he was again seen by his doctor and was found to be wheezing, with a blood pressure of 106 systolic, 60 diastolic. Examination of the heart at that time was not remarkable. Because of his symptoms he was referred to the hospital for treatment.

The family and past histories were, so far as was known, negative.

Physical examination showed a remarkably well-developed, well-nourished, muscular man who was orthopneic, dyspneic and cyanotic, with "asth-

matic" wheezing respirations. He could lie flat but was uncomfortable in so doing. There were rhonchi and wheezing throughout the chest, with rales at the bases posteriorly. The vital capacity was definitely limited. The heart was slightly enlarged to percussion. The heart sounds were not well heard because of the other sounds, although they seemed to be of poor quality. A split second sound, but no murmurs, was heard over the precordium, there were no murmurs. There was no edema or ascites. The liver and spleen were not palpable. The blood pressure, which was 128 systolic, 65 diastolic, in the sitting posture, was 160 systolic, 80 diastolic in the supine position.

The temperature was 101°F, the pulse 130, and the respirations 44.

Examination of the blood showed a red-cell count of 7,500,000 with 95 per cent hemoglobin, and a white-cell count of 13,000 with 92 per cent polymorphonuclears, the smear was normal. No urine was obtained for examination. The blood Hinton test was positive, the Wassermann weakly positive. An electrocardiogram showed a normal rhythm at 105, with a PR interval of 0.18 sec, and left bundle branch block. The corrected sedimentation rate was 0.4 mm per min, and the hematocrit reading 48 per cent.

The patient was given 10 cc of aminophyllin intravenously, and seemed quite well and comfortable during the day of admission, with but few wheezes at both lung bases. At 1.00 a m the night after admission, he became mildly dyspneic. Oxygen was administered by the nurse, and the dyspnea soon cleared. At about 2.30 a m, however, he suddenly became rapidly dyspneic and cyanotic, did not complain of pain, but attempted to remove the oxygen mask. In so doing he fell back dead.

DIFFERENTIAL DIAGNOSIS

DR MYLES P BAKER It would seem to me that the burden of proof in this case lies with the man who declares this is not a case of acute coronary occlusion on the basis of sclerosis of the coronary arteries. The man's age, fifty-six, is in the decade in which clinical coronary thrombosis is most frequently observed. There have been several months of progressive exertional dyspnea without anemia, of progressive exertional dyspnea without increased metabolic rate or respiratory-tract obstruction to account for the dyspnea. This is presumably cardiac dyspnea with diminishing cardiac reserve, the earliest symptom of a failing left ventricle, with pulmonary vascular congestion. The respiratory tract infection with cough is an added strain on the heart muscle. The paroxys-

mal dyspnea with substernal oppression was the most prominent symptom, more so than any crushing pain. It is the picture of cardiac asthma, of acute left ventricular failure, this is well known to be the conspicuous feature in some cases of proved coronary occlusion and myocardial infarction. Asthmatic rales were prominent, and interfered more, I gather, than the simple basal rales of congestive failure, with ascertaining whether the heart sounds were of good quality. It is important that no early diastolic blowing murmur of aortic regurgitation was audible. The blood pressure fell over night. The next day the patient presented a picture of left-sided ventricular strain and failure with little evidence of right-sided failure. The blood-pressure reading which showed a lessened pulse pressure when he sat up, I take to be simply evidence of lessened ability of the circulatory apparatus to adapt to the change in position. This finding is observed in some hypertensive patients but I think in this case is an indication of handicap in the circulatory apparatus. We have no evidence here for stating that the man had an antecedent hypertension. They have taken particular pains to tell us that during the acute episode the blood pressure was normal.

The fever on the day following the onset of symptoms, the rapid heart rate and the leukocytosis are all consistent with a diagnosis of myocardial infarction. The white-cell count is rather high, to be sure. The heart sounds were somewhat indistinct, in keeping with such a diagnosis. One wonders whether one could distinguish between a split second sound and gallop rhythm at the rate of 130. The electrocardiographic evidence of left bundle-branch block is consistent with the diagnosis of coronary occlusion. I believe this abnormal tracing sometimes occurs after an acute occlusion. On the other hand, it may indicate impoverishment of the blood supply of the heart muscle dating back over the months of exertional dyspnea, and the basis for such a process would be arteriosclerosis of the coronary arteries. The sedimentation rate I am inclined to discount as equivocal. The high red-cell count represents, I take it, a relative polycythemia due to the state of anoxemia, rather than being indicative of a true polycythemia.

Two questions arise as to differential diagnosis: the first as to whether this sudden accident and subsequent heart failure could be related to disease of the aorta. I think we can dismiss the possibility of a dissecting aneurysm because of the absence of outstanding pain with reference to the back and legs and the lack of a persisting hyper-

tension. The question of a pulmonary embolus with acute cor pulmonale arises. I think the absence of any previous accident to the legs, however slight, the absence of edema of an ankle or any story of phlebitis and the absence of the characteristic evidence, however transient, which may by electrocardiogram be demonstrated after acute pulmonary emboli, are all points that would make us unable to ascertain that diagnosis, however, it should be thought of—I think probably it was—in a man whose complaint was dyspnea and sternal oppression rather than pain.

Did syphilis play a part in this man's demise? He may well have had latent syphilitic aortitis, for such is not uncommonly the case, and perhaps one out of five individuals with latent syphilitic aortitis has no symptoms that would lead one to suspect the diagnosis. But I think two points are important: the paroxysmal dyspnea such as this man had is strikingly absent in uncomplicated syphilitic aortitis, and, although perhaps one out of six cases of syphilitic aortitis may have involvement of the coronary orifices in the process in the wall of the aorta, only about three fifths of these have symptoms of coronary insufficiency. I think it most unlikely then that even if this man did have syphilitic aortitis, for which there was no time to be more certain by a ray examination, his symptoms were due primarily to it, but rather to coronary disease with which the syphilis of the aorta was merely associated if present at all. Myocardial infarction as a result of a syphilitic process that partially or completely blocks the orifices of a coronary artery is rare indeed, and among cases reported from the Presbyterian Hospital there were only three or four of this sort noted.¹

The rare causes of relatively sudden cardiac death in cases with syphilis are probably not present here. Acute syphilitic myocarditis has been described but is still a point of controversy, and in such cases as I could find reported from the Baltimore City Hospital² about five years ago all were in younger individuals dying much more suddenly than this man who lived thirty-six hours after the first attack.

I should conclude that this man had, and that the pathologists would find, coronary thrombosis with myocardial infarction and possibly a syphilitic process at the root of the aorta, which one was unable to be more certain about during life.

DR. J. H. MEANS: The first attack that he had sounds like a textbook description of acute pulmonary edema which might have been an occurrence not necessarily associated with coronary disease. I agree that the argument in favor of coronary oc-

clusion is very convincing I should just like to mention that Dr Mallory did an autopsy for me some years ago on a patient whose manner of exitus was very similar to that of this man, so far as I can judge it from the description just given, and found no thrombosis of the coronary arteries, no infarction, nothing but a narrow coronary, narrowed by an atheromatous process. So I just throw that out as a possibility in this man, not as a probability.

DR TRACY B MALLORY Drs Blumgart, Schlesinger and Davis,³ as many of you undoubtedly know, have recently published a paper concerning the clinicopathological correlation of coronary artery disease and infarction of the myocardium in a considerable number of cases. They make a point with which I am very much in sympathy, namely, that the clinical diagnosis of coronary thrombosis is made very casually without realization that the syndrome is really that of infarction of the heart. Pure coronary thrombosis very frequently produces no recognizable clinical symptoms, and a diagnosis of coronary thrombosis does not necessarily connote infarction of the heart and vice versa. Dr Baker has committed himself to both coronary thrombosis and myocardial infarction.

DR PAUL D WHITE I want to make a correction in the electrocardiographic interpretation. It should read right bundle-branch block rather than left. That brings up the possibility, as in a case discussed here a while ago, of widening of the QRS complex of the right bundle-branch type as due to cor pulmonale, a very unusual but interesting association. It is therefore conceivable, though not likely, that this patient had recurrent pulmonary infarction rather than massive myocardial change from coronary disease.

DR MEANS If that is the case, pulmonary artery thrombosis becomes a possibility.

CLINICAL DIAGNOSES

Coronary heart disease
Paroxysmal nocturnal dyspnea

DR BAKER'S DIAGNOSES

Coronary thrombosis
Myocardial infarction
Syphilis of aorta?

ANATOMICAL DIAGNOSES

Coronary sclerosis, severe
Myocardial infarction, left ventricle

Syphilitic aortitis with aneurysm
Pulmonary edema and congestion

PATHOLOGICAL DISCUSSION

DR MALLORY The autopsy showed an enlarged heart, weighing 450 gm. There was massive infarction of almost the entire left ventricle, including the major part of the interventricular septum. The coronary arteries showed no demonstrable occlusion. They were everywhere markedly narrowed by atherosclerotic processes, and their mouths, particularly the mouth of the right coronary artery, were markedly narrowed by scars in the base of the aorta just above the aortic valve, which were undoubtedly syphilitic in origin. There was a very slight degree of separation of two of the aortic cusps. The conviction that this was a syphilitic process was raised to certainty when we found a small aneurysm at the beginning of the arch and a microscopic appearance entirely characteristic of syphilitic aortitis.

The lungs showed a very marked grade of pulmonary edema, and the other organs a slight amount of passive congestion, nothing else. So far as the autopsy was concerned I think we have good evidence of left-sided heart failure, and practically no evidence of right-sided failure.

DR MEANS Since this man was Japanese, since we know diseases of this type vary from race to race,—we know, for instance, there is a difference between Negroes and Whites,—and since Dr Cadbury, who is with us this morning, has just come back from Canton, I should like to ask him about coronary thrombosis and so forth in the Japanese. The Japanese now occupy Canton. Do they differ from our race with regard to cardiac symptomatology?

DR WILLIAM W CADBURY I cannot speak for the Japanese. I see none of them. We send them to their own hospital. In the Chinese, coronary thrombosis is extremely rare.

DR MALLORY How about cardiovascular syphilis?

DR CADBURY That is present. We get a fair amount of syphilitic disease of the aorta. Hypertension is relatively rare among the Chinese race.

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THE ANNUAL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY

For one hundred and fifty-nine years this oldest medical society, with a continuous existence in the United States, has conducted its annual sessions. The meeting this year was at the Copley Plaza Hotel, Boston, May 21 and 22.

Every detail of the program, arranged by the committee in charge, was ready for the assemblage. After registration and study of the agenda, the fellows and guests devoted time to the scientific sessions, inspection of the scientific and commercial exhibits and conferences.

The total registration for the two days was 1461, but some of those present did not have their names recorded.

The round-table meetings and luncheons, arranged for the noon intermission of the main

program on the first day, enabled the specialists to meet and discuss their particular problems with out adjustment to the needs of a general audience. By this arrangement all fellows, except the coun- cils, could attend any scientific session without missing any subject on the program.

The attendance at the several meetings of the specialists was 89 for medicine, 70 for pediatrics, 144 for obstetrics, 50 for surgery and 50 for der- matology.

Twenty-two members competed for the award of the Burrage Bowl and other prizes, the winners being Oliver Lothrop, low net, J. W. Henderson, 2nd low net, Thomas Cavanaugh, 3rd low net, R. S. Nugent, low gross, Robert Dutton, 2nd low gross and Joel Melick, 3rd low gross.

Provision was made for the visiting ladies to play golf, sign up for treks to various places of interest and for dinner at Horticultural Hall fol- lowed by a Pop Concert. About two hundred visiting ladies registered, but the number participat- ing in the special features of the program for them is not available.

Two hundred and twenty-eight attended the Tuesday morning general clinical meeting. The Council meeting was in session at the same time, thereby affecting attendance. In the afternoon the number rose to 388, and, with the increased regis- tration on Wednesday, the attendance at the morn- ing clinical meeting was brought to over 400. In the afternoon the number reached at least 600, for many could not get into the hall. The attend- ance at the annual dinner on Tuesday evening was 264. The quality of this repast was unusually good and the social atmosphere was enjoyable.

The address of Thomas Parran, Surgeon Gen- eral of the United States Public Health Service, in his delineation of the serious situation confront- ing the world and imposing great responsibilities on the people of this country, was a stirring ap- peal for united support of all classes. When, in closing, he portrayed the part medicine must play not only in meeting the peril to the health of the country but beyond that because of its under- standing of the psychology of all classes and its opportunity for assuming leadership in maintain- ing the traditions and ideals of the preceding

years, he roused his audience to an outburst of applause which demonstrated his power to bring his hearers into harmony with his convictions

The audience then adjourned to attend the Shattuck Lecture¹ in the adjacent hall, where 575 met to hear Dr Ernest W Goodpasture present a record of the efforts under way and the facts acquired in studies of the problems involved in virus infections and immunity relating thereto His treatment of the complicated and abstruse subject of virus diseases was a demonstration of his ability to interest the average doctor and make clear the methods of approach to these problems

A very large proportion of the 320 councilors were present at the meeting of that body, held on the forenoon of the first day This is a demonstration of the interest shown by these officials in the affairs of the Society

The first business on the program was the calling of the roll of the Nominating Committee with responses from delegates representing all but one of the eighteen district societies The committee retired and soon returned, reporting a list of names for consideration of the Council, as follows for president, Walter G Phippen, of Salem, vice-president, Frank R Ober, of Boston, secretary, Alexander S Begg, of West Roxbury, treasurer, Charles S Butler, of Boston, and orator, A Warren Stearns, of Billerica No other nominations appearing, the recommendations of the committee were approved and the Council unanimously elected the persons named for the respective offices

Most of the time was given to consideration of the reports of the standing and other committees So much study had been given to the duties of these committees and so much care in the drafting of their reports that they were accepted and the several recommendations adopted with only minor amendments in few instances and with no extended discussion

The President's nomination for membership of committees was submitted and adopted without debate No incidental business having been proposed, the meeting was dissolved after being in session less than an hour and a half, it was gen-

erally regarded as one of the shortest Council meetings of many years The official record will be published in the June 20 issue of the *Journal* and should be studied by the fellows of the Society for, according to certain recommendations: changes in the by-laws, as suggested by the Committee on Medical Education and Medical Diplomas, should have study by the general membership

The annual business meeting of the Society, with the President's address and the Annual Discourse was called to order by the President at eleven o'clock Wednesday morning The first business was the report of the Secretary, showing that the losses to the membership consisted of 99 deaths, 23 resignations and 38 deprivations, making total of 160 The additions consisted of 252 new members with 3 readmissions and 10 restoration a total of 265, making a net gain of 105, bringing the membership to 5542

No item of business appearing, the President then delivered the annual report on the condition of the Society, which he described as "very healthy" and after paying tributes to the Secretary, Treasurer, the councilors, committee members and a who have assisted in the administration of the affairs of the organization, he appealed for a concerted effort to induce all worthy physicians of this State to become members of the Society

He then explained the methods adopted for conducting the affairs of the American Medical Association and the relation of this Society thereto Other subjects presented were the advisability of more general utilization of the clinical material of the many hospitals in the State for postgraduate education, careful financial planning of the activities of the Society, and maintenance of the traditions and high principles of the profession so that the pitfalls into which some societies have fallen may be avoided This address and other delivered at the meeting will be published in early issues of the *Journal*

The Annual Discourse by Dr William Jaso Mixter on "New England, Neurosurgery and the Neurosurgeon" was then delivered² This essay will take high rank among others delivered before the Society

The meeting then adjourned for luncheon, furnished by the Society, with 327 members participating.

The general arrangements for the meeting were frequently commended by those in attendance with approval of the work of the Committee of Arrangements and the hope that subsequent meetings will follow the general scheme of this year. The only dissatisfaction expressed was that for a society of this size and with a very attractive program for its annual meeting, the attendance seemed to indicate that the large number of absentees do not appreciate the advantages of attending these meetings. However that may be, it is certain that those who were present profited by the experience.

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TWENTY FIRST ANNUAL REPORT OF THE COMMONWEALTH FUND

On October 17, 1918, the Commonwealth Fund was established by Mrs. Stephen Harkness with the avowed purpose of applying the resources of this trust to "promote the welfare of mankind." Every year since that time a report giving the details of the activities carried on by the administrative staff and the five main divisions, including the committees appointed for specified functions and the Child Guidance Council of Great Britain, has been published. These documents have demonstrated a broad conception of methods that may be employed to meet the problems relating to medicine, public health, and economic and sociologic conditions of the human race. It is probably true that the inciting reason for the establishment of this fund in 1918 was the chaotic situation incident to the war at that time, and although for several years grants from the fund were provided to help in the rehabilitation of the social structure, as time went on its interests became especially concentrated in the promotion of American health and agencies connected with

progress in this direction. These yearly reports show the accomplishments of this organization and demonstrate the wisdom of the plans adopted and the executive ability exercised in their application.

During the twenty-one years of operation nearly \$24,000,000 have been distributed to hospitals, state health departments, medical schools, clinics and medical societies. One interesting movement has been that of financing studies relating to criminology and various forms of social service, apparently in furtherance of the plan to bring preventive measures to bear on delinquency, which is possibly a factor in establishing anti-social tendencies.

Fortunately the educational features of this report are not obscured by dry statistical tables, but are presented in an engaging fashion which carries assurance of the generous concern of the officials of the Commonwealth Fund in the problems of human welfare. The report is worthy of careful study because of its informative quality, it will interest every student of the problems of medical education and public-health administration.

MEDICAL EPONYM

BUERGER'S DISEASE

Leo Buerger's (1879-) description of the disease bearing his name first appeared in the *American Journal of the Medical Sciences* (N. S. 136:567-580, 1908), under the title "Thrombo-angitis Obliterans. A study of the vascular lesions leading to presenile spontaneous gangrene."

The disease occurs frequently although not exclusively among the Polish and Russian Jews. We usually find it occurring in young adults. After longer or shorter periods, characterized by pain, coldness of the feet, ischemia, intermittent claudication and erythromelalgic symptoms, evidences of trophic disturbances appear which finally pass over into a condition of dry gangrene. I have come to the conclusion that we are dealing here with a thrombotic process in the arteries and veins followed by organization and canalization and not with an obliterating endarteritis. I would suggest that the names "endarteritis obliterans" and "arteriosclerotic gangrene" be discarded in this connection, and that we adopt the terms "obliterating thrombo-angitis" of the lower extremities when we wish to speak of the disease under discussion.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS
AND GYNECOLOGY*

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PYELITIS OF PREGNANCY TREATED BY NEPHROSTOMY

Mrs. E. L. F., a twenty-five-year-old primipara, five and a half months' pregnant, was admitted to the hospital on February 19, 1932, complaining of pain in the right groin with chills and fever of five days' duration. Shortly before there had been a milder attack with pain on the left side.

The family history was irrelevant. She had had no miscarriages and no children. An appendectomy had been performed four years previously. Catamenia had always been regular with a twenty-eight-day cycle and lasted three to four days without dysmenorrhea. The last regular period had occurred on September 17, 1931, making the expected date of confinement June 24.

Physical examination revealed a well-developed and fairly well-nourished young woman who presented the appearance of serious illness. The temperature on the evening of admission was 99.4°F, the pulse 124, and the respirations 28. The following morning the temperature was 102°F, the pulse 120, the respirations 24, and the blood pressure 95 systolic, 65 diastolic. The fundus of the uterus was at the level of the umbilicus. There was slight tenderness but no spasm in the right lower quadrant. Extreme tenderness and some muscle resistance were found in the right lumbar region. The entire abdomen was markedly distended, and the flanks were faintly edematous. A catheter specimen of urine contained innumerable pus cells in large clumps. The white-cell count was 9800. On the day after entry the patient developed a generalized punctate rash, which a medical consultant believed to be the result of toxemia.

On February 23, four days after admission, and when an intensive medical program had failed to afford relief, cystoscopic examination was carried out. The pelvis of the right kidney was irrigated with boric acid solution, followed by the introduction of 10 cc of 2 per cent Mercurochrome. The catheter was left in position in the right ureter for twenty-four hours. The white-cell count at

this time was 22,000. The blood urea-nitrogen was 25.6 mg per 100 cc. The blood Wassermann was negative. Urine obtained from the right kidney was thick and purulent, and the sediment contained 30 or 40 pus cells per high power field, the culture showed colon bacilli.

Three days later, on February 26, the temperature was subnormal and the pulse 120. The patient seemed somewhat improved, but the right kidney was still large and tender. Antiseptic lavage of the right renal pelvis was repeated, and a ureteral catheter again left in situ. The urine from this kidney appeared to be less cloudy but still contained abundant pus. Two days later the temperature and pulse rate had begun to subside but abdominal distention persisted. There was a mass in the right lumbar region which seemed to be increasing in size, and the patient was definitely jaundiced. It was decided to do a right nephrostomy.

The operation was performed on March 1 under nitrous oxide, oxygen and ether anesthesia, with the evacuation of a large amount of thick pus from the renal pelvis. Convalescence from the operation was perfectly satisfactory, except that the blood showed a hemoglobin of 55 per cent, a red-cell count of 3,850,000 and a white-cell count of 18,000. Because of this, 400 cc of citrated blood was given by transfusion on March 8. The patient suffered an attack of mastoiditis two days later, which was treated conservatively. On April 1 perirectal abscesses developed, these were satisfactorily treated by poultices.

On April 16 the patient was delivered by low forceps of a premature child, who was in good condition. The patient was discharged on May 2. There is no follow-up record on this patient.

Comment. This is a most unusual and severe case of pyelitis during pregnancy, complicated by mastoiditis. Conservative medical treatment, renal lavage and ureteral catheterization failing, nephrostomy was performed with highly satisfactory results. This procedure is rarely necessary, and then only as a life-saving measure.

DEATHS

BENNER—BURNHAM R. BENNER, M.D., of Lowell, died May 29. He was in his ninety-fourth year.

Born in Pittston, Maine, he received his education in the public schools of Roxbury and the Harvard Medical School, receiving his degree from Columbia University College of Physicians and Surgeons, New York City, in 1875.

Dr. Benner was a member of the Massachusetts Medical Society and the American Medical Association, and had retired from active practice.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

GOODMAN—**SAMUEL GOODMAN** M.D. of Boston died May 28. He was in his seventy sixth year.

Born in Kalwarya, Lithuania he came to New York City in 1871. He received his degree from New York University Medical College in 1889 and began the practice of medicine in Boston the following year. He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, a son and a daughter survive him.

SEARS—**GEORGE G SEARS** M.D. of Boston died May 27. He was in his eighty second year.

Dr Sears attended Amherst College and received his degree from the Harvard Medical School in 1885. He was former chief of the medical staff and trustee of the Boston City Hospital and was instrumental in founding the Thorndike Memorial Laboratory at the Boston City Hospital. Since 1924 he was a trustee of the Forryth Dental Infirmary and was professor emeritus of clinical medicine at Harvard Medical School.

Dr Sears was a member of the Massachusetts Medical Society, the American Medical Association and the Association of American Physicians.

A daughter and two grandchildren survive him.

long a patient should be hospitalized for a given illness. We know that treatment is not a matter of statistics.

The solution to this problem is to reach the subscriber with an appeal for fair play and to educate him in the fact that his full benefits are available only if needed but that abuse of these benefits could result in a general loss to all subscribers.

To this end we earnestly request your support.

R. F. CAHALANE *Executive Director*

230 Congress Street,
Boston

REPORTS OF MEETINGS

BOSTON ORTHOPEDIC CLUB

At a meeting of the Boston Orthopedic Club at the Boston Medical Library on February 12 Dr Bernard M. Jacobson spoke on "The Diagnosis of Multiple Myeloma," describing studies by himself and Drs. Alfred Krane, Edward A. Gall and James R. Lingley. The speaker briefly recounted the previous eras in the diagnosis of this disease: the first prior to 1898 when the appearance of one or more visible tumors was the only method available, and the second from 1898 to 1933 when the condition was suspected only on roentgenological findings.

That multiple myeloma is actually increasing was demonstrated both by the percentage of admissions and by that of autopsies for successive periods. From 1913 to 1917 there were at the Massachusetts General Hospital 0.3 cases per 10,000 admissions and this increased to 3.5 cases from 1933 to 1937. That better diagnosis did not account for this rise was shown by the post-mortem statistics, which showed that there have been 6 cases of multiple myeloma in every 1000 autopsies since 1933 as compared with 1 case prior to that date. No cases have been solicited. Dr Jacobson pointed out. The modern era in the diagnosis of multiple myeloma which started at the Massachusetts General Hospital in 1933, includes 29 cases, which served as a basis for Dr Jacobson's talk.

The outstanding symptom was pain in 21 of the patients, in 9 of whom it simulated polyarthritis. Pain in the spine or hips, which is emphasized in textbooks, was found in only 8 and pleuritic pain predominated in 6 patients. Physical examination was not found very useful for only 11 of 28 showed abnormal signs. Five of these were in the spine, 4 in peripheral joints and 2 in the ribs.

It was in regard to laboratory data that Dr Jacobson found the greatest diagnostic assistance. Presumptive findings were Bence Jones proteinuria which occurred in half the cases, and plasma cells in the blood smear which were found in 20 per cent. Considered strongly suggestive evidence were "typical" roentgenological findings (40 per cent) a plasma protein value of more than 8 gm. per 100 cc. (50 per cent) and an elevated blood calcium in the presence of a normal phosphatase (40 per cent). Somewhat less suggestive tests were the characteristic precipitation of Hayem's solution (50 per cent) an anemia which tended to be macrocytic (90 per cent) and renal insufficiency (40 per cent).

The speaker then discussed each of these diagnostic aids in detail. The only diagnostic roentgenologic changes were described as small, fairly discrete areas of decreased density found most frequently diffusely distributed, in the skull (in 10 of 25 cases) pelvis (in 6 of 21 cases) spine (in 5 of 21 cases) and ribs (in 3 of 23 cases). This was found not to be a true index of the degree of bone marrow invasion, however for the last x ray films were

CORRESPONDENCE

A WARNING

To the Members of the Massachusetts Medical Society: A man giving the name of Roger Maloney and stating that he was engaged in the cancer education program called on a fellow of the Society April 16, at 9 p.m. claiming that he was stranded and needed a loan of three or four dollars. He gave my name as reference.

No one is employed by the Cancer Committee of the Massachusetts Medical Society or authorized to ask for funds.

SHELDON WARREN M.D., Chairman
Cancer Committee.

195 Pilgrim Road
Boston.

ASSOCIATED HOSPITAL SERVICE

To the Members of the Massachusetts Medical Society: We have moved to larger quarters. Our new location is the Western Union Building, 230 Congress Street. Our telephone number is Hubbard 8800.

We appreciate the fact that the unusual growth of the Blue Cross, which made this move necessary within two and a half years is due largely to your acceptance and endorsement of our place in the hospital work of the community.

Three thousand two hundred and eighteen doctors have sent 38,000 Blue Cross patients to Massachusetts hospitals during the past two and a half years. With rare exception you have graciously co-operated with us in making fair decisions in connection with these admissions. Because we believe that 95 per cent of you are interested in the continued success of the Blue Cross we do not hesitate to lay before you one of our current problems.

We have observed the tendency of our subscribers to stay in the hospital as long as Blue Cross benefits are available. This indicates that the length of stay is very often governed by these benefits and not by the course of the patient's illness. We shall never attempt to decide here how

often negative even when the autopsy showed bone lesions. The differential diagnosis should include metastatic carcinoma, hyperparathyroidism, senile osteoporosis, Paget's disease and giant-cell tumor. It was suggested that if only one plate can be obtained that of the skull is most apt to be helpful.

Dr Jacobson stressed the importance of an elevated serum protein, which was found to depend on an increase of the globulin fraction. A total protein of more than 8 gm per 100 cc was found in 14 of 26 cases, while a globulin value above 3 gm. was present in all 13 patients in whom the determination was made. The formol-gel test, which depends on this latter phenomenon, was found positive in each of the 10 cases in which it was tried, and was advocated as the earliest and easiest means of determining the presence of this highly suggestive elevation of globulin. The precipitation of Hayem's solution during a routine blood count, which was noted in almost half the cases, was also attributed to this alteration in the blood.

Hypercalcemia of 11 to 14 mg per 100 cc. was observed in 9 of 22 patients, whereas the serum phosphatase had a value of less than 5 Bodansky units in 17 of these cases. This combination of circumstances, together with a serum phosphorus of 3 to 5 mg per 100 cc. found in 18 of 23 cases, helped in ruling out hyperparathyroidism, Paget's disease and most cases of metastatic carcinoma.

Renal insufficiency, evidenced by an elevated nonprotein nitrogen and a diminished phenolsulfonephthalein excretion in 13 of 29 patients, was considered to be caused by the amorphous precipitate found in the kidneys and identified as Bence Jones protein. The condition was described as a 'tubular hydronephrosis'. Terminal uremia ensued in 7 of 15 patients examined, and 10 of these exhibited pathological evidence of renal involvement.

Dr Jacobson pointed out that 24 of 29 patients were suspected of having multiple myeloma before biopsy or autopsy, as a result of following up an initial clue. This clue in 10 of 29 cases was offered by the roentgenograms either alone or together with a urinalysis or a renal function test. Anemia, usually with x-ray or blood chemical findings, showed the way in 6 cases, while altered blood chemical findings and the presence of plasma cells in the routine blood smear offered the initial clue in 4 or 5 cases each.

It was instructive that only 6 of 29 patients were saved because of symptoms—5 for back or hip pain and 1 for rib pain. Two cases were primarily considered to be due to pulmonary carcinoma and pleurisy respectively.

The diagnosis, Dr Jacobson pointed out, must be substantiated by histological examination. Biopsy sites suggested were accessible lesions, or cancellous marrow, such as that of the sternum studied by means of a sternal puncture. The latter established the diagnosis in 8 of 29 cases.

The prognosis was held to be grave. In 17 of the 20 fatal cases the patients died in one to sixteen months, with an average of seven months, while in 3 they lived two to three and a half years. One patient is living after five years, having had a peripheral lymph node positively diagnosed, but having as yet no demonstrable bone lesions by x-ray. Deep x-ray therapy, both local and spray, was found useless in prolonging life, and only of questionable value for the relief of spinal pain.

In discussion Dr George W. Holmes admitted that the skull offers the best single chance of finding bone lesions by x-ray but warned that lesions may occur elsewhere when the skull appears negative. He pointed out that roentgenological evidence is present only after involve-

ment of the cortex, which may occur late or never in a condition affecting primarily the marrow.

Dr Benjamin Castleman emphasized the importance of the technic of determining Bence Jones proteinuria. He said that solitary myeloma, although possible, is usually indicative of an early case or a single manifestation of an already widespread condition. Pathologically, splenomegaly was found in half the cases—a compensatory hematopoiesis for the decreased amount of bone marrow. The finding of a more or less normal phosphatase value was explained by the nature of the process, which is almost entirely destructive rather than formative.

Dr Jacobson concluded with the statement that the cancellous bone is invaded 100 per cent, despite negative x-ray evidence or gross autopsy examination. Patients with a "solitary plasmoma" have lived eight to ten years, but their span is usually two to three years, postmortem examinations reveal widespread disease and even early sternal biopsy is usually positive.

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on February 27, with Dr Frank R. Ober presiding.

There was the usual presentation of cases. The medical patient was a twenty-three-year-old girl admitted with a complaint of external dyspnea for one year and a chronic cough for six months. As a child, she had been admitted to the Children's Hospital complaining of nausea, vomiting, and stiff neck. The spinal fluid contained 5 monocytes per cubic millimeter, there was an anemia and clumps of leukocytes were found in the urine. She was discharged well but returned in two months with a positive Kernig sign, increased spinal fluid pressure and an elevated globulin content. A diagnosis of acute anterior poliomyelitis was made, and corrective operations were performed later. There were always clumps of white blood cells in the urine at subsequent admissions. The patient, being able to get around on crutches, had worked until one week prior to the present admission. Digitalis had been recommended six months before by a local doctor but was voluntarily discontinued in October. Physical examination revealed an enlarged heart with a pre-systolic gallop rhythm, basal rales in the lungs, weakness of the arms and a deformed left leg. The hemoglobin was 24 per cent, the erythrocyte count 1,400,000, and the leukocytes 6000. The serum calcium was 8.8 mg and the phosphorus 11.0 mg per 100 cc, and there was a reversed albumin globulin ratio. Roentgenograms demonstrated an enlarged heart, congestive lung changes, marked atrophy of the left leg and odd changes of the vertebrae. A blood transfusion was administered after an attempt to improve the patient's general condition, but there resulted temporary orthopnea. While in the hospital there was an episode of eight convulsions which finally responded to chloroform after intravenous calcium lactate and the barbiturates had failed.

Dr M. C. Sosman stated that the appearance of dense vertebral plates was disturbing when one was looking for evidences of renal rickets. In that condition one expects true decalcification rather than ossification. Dr Sosman Weiss remarked that the congestive failure was undoubtedly secondary to a chronic pyelonephritis dating from childhood although unsupported by a positive history. He noted the presence of left-sided heart failure, as evidenced by the x-ray films and by clinical manifestations, and the absence of right-sided failure, a combination which caused orthopnea only after a transfusion, and said that anemia

might explain this phenomenon. Dr Weiss added that bone changes are a common accompaniment of pyelonephritis occurring in childhood and may cause physical retardation and renal dwarfism.

The surgical case was that of a fourteen-year-old boy who was one of twins born at a difficult birth and who had had an illness at two years of age which was possibly poliomyelitis. Following that episode there was gradual difficulty in touching his left heel to the ground. Athetosis of the left arm developed at the age of nine, and a chordee only for postencephalitic athetosis was performed three years later at another hospital. Somewhat later there intervened episodes of falling backward his head was held to the right with hypertrophy of the neck muscles, and there was weakness of the muscles on the left with spasticity of the leg on that side.

In discussing the case, Dr Ober reminded his audience that spastic and flaccid paralyses occurring in the same patient are rare. Nature does not seem to strengthen the limbs of the poliomyelitis victim by superimposing a spastic paralysis. Dr William T Green stated that this boy had had his athetosis well cared for but that follow ups on this and other cases indicate that there may be a progressive muscle weakness on the affected side and possibly a recurrence of the athetosis.

The speaker of the evening was Dr Ralph K. Ghormley, of Rochester, Minnesota, whose subject was "The Life History of Bone Grafts: Experimental and clinical observations." Dr Ghormley stated that his concept that the effectiveness of the take of a graft was proportional to its permeability resulted originally from some observations on patients decalcified and subjected to straightening of their scolioses by Dr J. C. Aub.

The speed of take was determined for various bone grafts in adult dogs. Periosteal grafts showed no activity and it was concluded that this layer of bone acts merely as a limiting membrane in the adult. Cortical grafts resulted only in preosteous tissue being laid down whereas cancellous bone removed from the iliac crest showed rapid invasion by the host. It was pointed out that these transplants atrophy to some extent over a period of time and are subject to fractures during this temporary weakness. Dr Ghormley stated that the mechanism is one of metaplasia of the surrounding tissue and that chemistry and the porosity of the graft are important factors in the efficacy of the operation.

The speaker went on to describe the optimal graft for various sites. Cortical bone, especially from the tibia, was advocated for splinting of ununited long-bone fractures, scoliosis, large cystic defects, tuberculous spondylitis and spondylolisthesis. Cancellous grafts, preferably from the iliac crest, were considered suitable for lumbosacral stabilization of two vertebrae only for shelving operations in old congenital dislocation of the hip, for filling large bone cysts in combination with cortical bone and for ankylosing a hip. Osteoperiosteal grafts were held useful only in extensive scoliosis of the spinal column where the curve prevents the use of more stable transplants. The fibula due to its resistance to a shearing force, can be used to advantage for ununited fractures of the femoral neck and for replacement of the tibia in the Huntington operation. Rib grafts may be employed, suggested Dr Ghormley where scoliosis, causing severe rib deformity makes it advisable to remove ribs and replace them along the spinal column. The chip and shave grafts were called risky due to their tendency to resorb readily especially in the presence of even slight infection. Match grafts, which are merely even shaped cortical bone, were deemed satisfactory for uniting bone. "Delayed" grafts, which are left in the

donor temporarily after cutting were held to be merely another method for obtaining optimal permeability of the bone transplant.

Dr Ghormley in considering homogeneous grafts, concluded that they give less satisfactory results than autogenous ones and that the closeness of kin has no effect on the results. He was of the opinion that it is wise to match the serums preoperatively even though this has not been proved necessary. Heterogeneous grafts should be used only in those circumstances in which autogenous or homogeneous grafts are not available.

Infection was said to be the commonest complication of bone grafting. Dr Ghormley recommended waiting six months to two years after the primary infection has apparently subsided before attempting such procedures. When this complication appears after grafting, conservative treatment of the wound often leads to an ultimately good result. It was stated that the most important factor is the amount of resultant scar tissue around and between the bone fragments. Fracture may occur in the graft on malunited or ununited fractures and these should be immobilized by external fixation. Such complicating fractures may reunite in cases of scoliosis but not of tuberculosis of the spinal column.

The course of such transplants depends on the amount of invasion by the surrounding connective tissue. Usually the grafts remain in situ and are incorporated in the host bone as a result of the activity from stress and strain on the weakened part. The character of the engrafted bone remains unchanged. Grafts may occasionally be entirely absorbed for unknown reasons.

Dr Robert Osgood, during the discussion questioned whether the status of the osteoperiosteal graft had been decided in regard to its osteogenesis. He stated that it depended on one's concept of what constitutes the periosteum and consequently how much is removed. Dr Ghormley agreed and emphasized that the degree of osteogenesis is also inversely proportional to the age of the donor.

NEW ENGLAND SOCIETY OF PHYSICAL MEDICINE

The regular meeting of the New England Society of Physical Medicine, held at the Hotel Kenmore on February 28 was devoted to a symposium on the treatment of arthritis. The internal aspects of the subject were discussed by Dr J. Sydney Sullman. He considered the arthritides in two groups, one in which the etiology was known the other in which it was unknown. He emphasized that it was in the former group that the internist procured the best results. The striking results in the management of gonococcal arthritis with sulfanilamide and the promising results of sulfathiazol in the treatment of staphylococcal infections were mentioned. Colchicine, instead of cinchophen, was recommended for gout, since adequate relief of pain can be gained without the danger of marked toxicity.

In the treatment of arthritis of unknown cause, Dr Sullman reminded the group of the lack of a measuring stick for the evaluation of various measures. However it was believed at the Robert Breck Brigham Hospital that examination of the hemoglobin the sedimentation index, the weight of the patient and the local condition of the joints offered the best criteria for evaluation. Removal of the foci of infection was considered no more beneficial in patients with arthritis than in others and it was ad-

vocated only in cases where such a procedure would ordinarily be carried out. The anemia, which is often resistant, should be attacked by transfusions. The vitamins were found not to benefit the arthritis, even when known deficiencies were corrected. Psychotherapy was stressed as a valuable adjunct to therapy since studies have shown that in the majority of patients with rheumatoid arthritis the onset of the disease or the exacerbations are related to emotional or economic stress. Estrin may benefit a certain number of women with menopausal arthralgia if given in doses of 10,000 to 30,000 units weekly, it was stated. Bee sting, snake venom, artificial jaundice and sulfur were held to be unsatisfactory forms of treatment, while gold injections were considered too dangerous for the questionable benefit obtained.

Dr J P Bill discussed "Diet and Hygiene for the Arthritic." The speaker impressed on this audience the importance of proper clothing, heating and well-rounded diets amid cheery surroundings. Dr Bill was of the opinion that foci of infection should be diligently searched for and attacked, and that the colon was undoubtedly an underestimated source of such trouble. The manufacture of simple apparatus for applying dry heat and contrast baths in the home was described, and this type of treatment was advocated for the large group of patients who are unable to afford the orthodox methods. Dr Bill suggested a diet individualized with due regard to the idiosyncrasies of the patient and his need for added or decreased weight.

"The Use and Abuse of Physical Agents" was the title of the talk by Dr Herman A Osgood. He listed among abuses the employment of complicated methods when simpler measures are adequate, the overemphasis of one form of treatment or type of apparatus and the use of uncomfortable and even dangerous fever therapy when unnecessary. The preliminary use of heat prior to massage was advocated, with the infra red lamp being used for superficial heat and diathermy for deep heat. It was pointed out that short wave diathermy is merely a convenient form of heat and has no therapeutic specificity. Overheating may injure the cartilage if prolonged. X ray therapy may prove beneficial in rheumatoid arthritis, may relieve pain in hypertrophic arthritis and may depress the overgrowth of pannus by its action on the sensitive young cells.

The final talk of the evening, on the orthopedic aspects of the problem, was presented by Dr Loring T Swaim. The importance of proper posture as a protective measure for the proper functioning of vital organs was stressed. Recent work has shown the value of preventing rather than attempting to treat deformities of arthritis. During the acute, painful stage, plaster shells are applied to the affected part in the most comfortable approach to an overcorrection of the tendency to flexion deformities. It was found that this allows complete muscular relaxation and prevents the damaging spasm.

The striking results of these measures were demonstrated in Strumpell-Marie's disease, where jackets are applied to prevent and help correct the "poker back." Fifty per cent of an original group were found to have complicating fixation of the hips, and half of these were greatly benefited by this plaster jacket. During a five-year period, no patient treated early in the disease by this method has developed ankylosis of the hips, Dr Swaim suggested that such changes are secondary to the spine deformity. It was even claimed that some slight improvement may be brought about in already fused spines by gradual straightening of the jacket, while progression of ankylosis can certainly be retarded if not prevented.

NOTICE

ANNOUNCEMENT

SYDNEY J ALLMAN, M D, announces that his correct address is 52 Columbia Road, Dorchester, and not 215 Main Street, Hightstown, New Jersey, as given in the *Directory of the Officers and Fellows* of the Massachusetts Medical Society.

SOCIETY MEETINGS AND CONFERENCES

- JUNE 7-8 — American Heart Association Page 469 issue of March 14
 JUNE 7-10 — American Board of Obstetrics and Gynecology Page 603, issue of April 4
 JUNE 8 — Dedication of Osler Memorial Page 862 issue of May 16.
 JUNE 8 and 10 — American Board of Ophthalmology Page 719, issue of November 2
 JUNE 8-10 — American College of Chest Physicians Page 781, issue of May 2.
 JUNE 10 — American Medical Golfing Association. Page 824 issue of May 9
 JUNE 10-11 — American Neisserian Medical Society Page 898 issue of May 23
 JUNE 10-14 — American Medical Association Annual meeting New York City
 JUNE 10-14 — American Physicians Art Association Page 332, issue of February 22.
 JUNE 12 — Harvard Medical Alumni Association Page 938, issue of May 30.
 JUNE 12 — New England Obstetrical and Gynecological Society Page 894, issue of May 23
 JUNE 12 — Jefferson Medical College Alumni Association Page 898, issue of May 23
 JUNE 23-25 — Maine Medical Association. Annual meeting Bangor Lakes
 JUNE 25-27 — Medical Library Association Page 862 issue of May 16.
 JUNE 27 — Pentucket Association of Physicians The Try-Angle, Grotonland
 SEPTEMBER 2-6 — American Congress of Physical Therapy Page 862, issue of May 16
 OCTOBER 8-11 — American Public Health Association. Page 655 issue of April 11
 OCTOBER 11-12 — Pan American Congress of Ophthalmology Page 894, issue of May 23
 OCTOBER 14-25 — 1940 Graduate Fortnight of the New York Academy of Medicine. Page 938 issue of May 30
 OCTOBER 21 — American Board of Internal Medicine, Inc. Page 369, issue of February 29

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

JULY 31
 OCTOBER 30

BOOK REVIEWS

Gonorrhea in the Male and Female A book for practitioners P S Pelouze Third edition, thoroughly revised. 489 pp Philadelphia and London W B Saunders Co, 1939 \$6.00

This book has become established as the American classic on the subject, and consequently a third edition is welcomed, especially as it appears at a time when such drugs as sulfanilamide and sulfapyridine have come into widespread use in the treatment of gonorrhea. Dr Pelouze warns against too ready belief that the disease has been completely eradicated, he cites cases in which the disease recurred soon after a quick sulfanilamide "cure," and advises continuing to use the time tried proofs-of-cure before pronouncing a patient well.

In addition to urethritis and endocervicitis, Dr Pelouze goes into the various complications of gonorrhea, such as arthritis, proctitis and so forth. The section containing case histories has been omitted, but Dr Pelouze,

who is a crusader for the better control of gonorrhea and for the abolition of the taboos surrounding the whole subject, has added one on "The Medical Profession and Gonorrhea Control."

All in all this new edition, which goes thoroughly and fundamentally into all aspects both scientific and social of gonorrhea, will undoubtedly ensure the continuance of this book's pre-eminent position.

Traitement de la Blennorrhagie par le sulfamide une sulfone et leurs dérivés M. Palazzoli and F. Nitti. 195 pp. Paris Masson et Cie, 1939 35 Fr fr

Specific chemotherapy has radically changed the treatment of gonorrhea. Sulfanilamide was first used for this purpose in 1937, with results which were truly amazing. Other sulfur compounds, derivatives of sulfanilamide and developed for the most part in Europe, have been employed for this purpose. The authors of this monograph write from extensive experience in the research laboratories and clinics of the Institut Pasteur and Institut Prophylactique and Hôpital Broca of Paris. A review of former methods of treating gonorrhea admittedly ineffective, is contrasted with the brilliant results now obtained when the sulfur compounds are properly used. The action, dosage and results obtained with sulfanilamide and four of its derivatives are discussed in a convincing manner. Sulfapyridine and para-amino-benzene acetyl-sulfamide are preferred to other compounds. The small doses of all these drugs as used by the authors are of considerable interest and raise the question as to whether therapy has not been too enthusiastic in this country. This book is easily read with a minimum knowledge of French and should be studied by anybody interested in the treatment of gonorrhea.

The Employment of Fine Silk in Preference to Catgut. The advantages of transfixing tissues and vessels in controlling haemorrhage William S. Halsted. 34 pp. Boston Welch Bibliophilic Society 1939 \$3.00

Shortly before his death, Dr. William H. Welch suggested to a group of his friends that a small society be founded for the purpose of republishing medical papers and treatises of importance which were not easily available to the student or scholar. At intervals since then, the Welch Bibliophilic Society has caused to be reprinted such papers as Welch's own remarkable monograph "The Interdependence of Medicine with Other Sciences of Nature" and Holmes's "Dissertation on Acute Pericarditis."

The present publication would have delighted the society's patron. It is in many respects the most important of his great friend Halsted's publications. In it are clearly and characteristically set forth the great principles of America's greatest surgeon, namely absolute hemostasis, delicacy in the manipulation of tissues and the leaving of delicacy a minimal amount of the least irritating foreign material in the wound also included is an account of the first use of rubber gloves, gutta-percha tissue and silver foil. The exposition is based on the advantages of fine silk as a suture material for its use enforces a discipline on the surgeon which makes roughness and careless hemostasis impossible. The reappearance of this paper is timely in view of the veneration which Halsted's teachings are receiving from the clinical and laboratory researches of Reid, Whipple, Parsons, Shambaugh and Dunphy and many others.

The volume, like its predecessors, is a triumph of the bookmaker's art. The paper typography and binding are beautiful, the reproductions of Brodel's unique illustrations are excellent. It will be eagerly sought by libraries, collectors and surgeons, since the edition is limited. The

reviewer is amazed at the modest price for which the book is offered. It is to be hoped that reprintings of the first edition can be arranged so that it will become easily available to senior students and interns in surgery for whom it should be required reading.

Medical State Board Examinations Topical summaries and answers An organized review of actual questions given to medical licensing examinations throughout the United States. Harold Rypins. Fourth edition, revised. 448 pp. Philadelphia, Montreal and London J. B. Lippincott Co. 1939 \$4.50

This book was designed to assist graduates of approved medical schools to pass examinations conducted by the medical registration boards of this country.

The late author had had a long experience on these boards and also on the faculties of medical schools and was therefore qualified to approach the problems of medical education and licensure with an understanding mind. He found that some applicants for medical registration appear before examining boards handicapped by the disturbing fear of failure or in poor physical or mental condition because of faulty preparation for the ordeal.

Even though the rejection of graduates of approved medical schools does not exceed 5 per cent on the average, some worthy candidates need advice as to the best ways to prepare for the examination and the art of expression in order to satisfy the authorities of competence necessary to meet the exigencies of medical practice.

It is well explained in the text that the custom of so-called cramming and the use of stimulants immediately before an examination tend to upset the mental equilibrium of a candidate and that this may operate to his disadvantage. Another warning is expressed in the explanation that the written question and answer method does not cover the scope of the examinations as now conducted by many boards, for the candidate may be required to show familiarity with technical laboratory methods which are not susceptible of written descriptions.

Taken all together the applicant for medical licensure may study this book and profit by the advice contained therein. It is well written and informative to an unusual degree.

Treatment in General Practice The management of some major medical disorders Vol 1 and 2. 695 pp. Boston Little, Brown & Co., 1939 \$7.50.

The fact that these two volumes appeared in England over three years ago does not detract from their value, the essence of which is concise practical summaries of the treatment in most of the major medical disorders by distinguished English clinicians, many of them well known in this country. The directions for nursing care, diet, general management and convalescence, as well as the use of drugs are detailed and specific.

A satisfactory feature is to find actual prescriptions written out. It is too bad that many proprietary names are used and that references are to the British *Pharmacopoeia*. This is inconsistent with the practical and otherwise time-saving features of the edition. Though specific, some of us may question the scientific basis for certain of the prescriptions. Nevertheless, one cannot but admire the therapeutic faith of one author who suggests for hemoptysis in mitral stenosis that the coagulability of the blood may be diminished by one teaspoonful three times a day of an aqueous solution containing sodium citrate and tincture of orange peel or by applying two or three leeches over the skin of the chest and by giving a grapefruit every day.

One notices the references to treatment by manipulation, the employment of physical methods, spa treatment and climatotherapy. It seems to this reviewer that our accepted therapeutic efforts might be extended in these directions, though many of the spas and watering places mentioned in these volumes are now, unhappily, as unavailable to our English cousins as to ourselves.

One Hundred Thousand Days of Illness Dorothy Ketcham 477 pp Ann Arbor Edwards Brothers, Inc., 1939 \$2.10

Each year in the United States more than a million children are admitted to hospitals. This book traces in detail how the non-medical and social needs of these children have been met at the University Hospital, Ann Arbor, Michigan. The book is essentially an appraisal of the experience during hospitalization and subsequently of 275 patients during 100,000 days of illness over a sixteen year interval (1922-1937). It describes in great detail, often with interesting photographs, the case work, occupational therapy, special activity and library service so well organized at the hospital in question.

The book should be of especial interest to hospital social-service workers and to the librarians of hospitals. It is attractively planographed, and the design for the interesting and unusual dust jacket was made by the children themselves using finger paints.

Obstetrical Practice Alfred C. Beck Second edition. 85 pp Baltimore Williams & Wilkins Co., 1939 \$7.00

The second edition of this excellent obstetric text has brought up to date the essential advances in the subject. The results of recent research in embryology and in the physiology of menstruation and lactation have been incorporated in appropriate chapters. The reviewer was particularly impressed by the interesting arrangement of recent information regarding the physiology of the placenta, especially placental interchange. Chapter 7 on changes in the maternal organism during pregnancy is especially well done, its arrangement is excellent, and the factual material is compendiously presented.

The author presents clinical problems and their treatment in a concise, clear and authoritative manner. There are over one thousand illustrations, many diagrammatic but all of them clear and pertinent to the subject matter.

This book is a valuable source of information for the undergraduate student and for the physician in general practice. While it is too brief to be used as a reference book by the obstetrician, it contains much recent material in which he will be interested.

Nutrition and Physical Degeneration: A comparison of primitive and modern diets and their effects Weston A. Price 431 pp New York and London Paul B. Hoeber, Inc., 1939 \$5.00

'Dr. Price has written,' says Professor Earnest Hooton in his foreword, "what is often called 'a profoundly significant book.' The principal difference between Dr. Price's work and many others so labelled is that in the present instance the designation appears to be correct." With this estimate the reviewer wholeheartedly agrees. For basically simple as are Dr. Price's studies they are of fundamental importance, and his conclusions, taken at full implication, emerge as new and highly provocative of thought.

It has long been recognized that modern civilization has been attended by certain degenerative changes in man's body. Tooth decay is conspicuously rampant, together with severe malformation of the dental arches. Why should modern civilized man have such wretched teeth? Or conversely, why should his more primitive brother have such good ones? Dr. Price seems to have been the first to see that the answer to this second question might serve in great measure to answer the first. He set about to find it.

There exists a sufficiency of such primitive human material for study, scattered about the world are isolated remnants of primitive racial stocks still practically free from dental ills. Dr. Price studied groups in Switzerland, the Outer and Inner Hebrides, Alaska, parts of the United States and Canada, the islands of the south Pacific, eastern and central Africa, Australia and New Zealand, the Malay peninsula and the Amazon basin. He even investigated the ancient peoples of Peru and their descendants.

All these groups were studied in relation to their own blood relatives (when existent) who had adopted the white man's diet, as well as the Whites themselves in the same or contiguous areas. Naturally, the diets of such scattered groups appeared to vary enormously; the Eskimo must eat very differently from say, the South Sea islander, and the man of the seashore from the dweller in mountain fastnesses. Yet there must be a common dietary factor, nutritional factor, if you prefer, which ensures, apart from all climatic and geographic circumstances, an almost perfect dental status. And that factor is, says Dr. Price, an extremely liberal content in the diet of "the fat soluble activator group" of vitamins—a group, he thinks, much larger than we yet know anything about.

The most startling thing about Dr. Price's observations is that diet appears to be not merely an important but practically the sole determinant of sound teeth and regular dental arches. A mixed racial heredity—very frequently charged with a heavy responsibility—he thinks has nothing much to do with it, for the stocks which he studied, immediately on adopting the diet of modern civilized man, began to suffer from dental ills, and the very first generation born after the adoption showed invariably a high incidence not only of tooth decay but of dental malformations.

But though enough has been given here, it is hoped, to convey the importance of Dr. Price's work, no brief review can possibly do him justice. Emphatically he deserves a full reading by anybody who is concerned in any way with the scientific aspects of nutrition. Man needs to think, this book should make him.

Problems in Prison Psychiatry J. G. Wilson and M. J. Pescor 275 pp Caldwell, Idaho The Caxton Printers, Ltd., 1939 \$3.00

The application of psychiatric principles to the management of criminals has been a slow and at times discouraging task. Perhaps its greatest stimulus came when the United States Public Health Service undertook to set up psychiatric clinics in the federal prisons. This book presents briefly and clearly the story of the experiences of two of the pioneers in this undertaking. The introduction by Dr. Treadway starts us off with enthusiasm. The book is conservative and throughout constantly expresses that un-commonest of human qualities, common sense. The reader is continually conscious of the fact that the authors have been through the mill and have learned about prisoners and prisons from actual work.

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AGNOGENIC MYELOID METAPLASIA OF THE SPLEEN*

A Syndrome Simulating Other More Definite Hematologic Disorders

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IT IS well recognized that a varying degree of extramedullary myelopoiesis occurs in a wide variety of pathologic conditions. It has, for example, been seen in association with carcinoma metastatic to bone, it is not infrequent in certain infectious states such as scarlet fever, and it has been noted in generalized sepsis, tuberculosis of the spleen and in areas of pathologic calcification and ossification.¹ Under such circumstances, the process is of pathological interest only, for the primary underlying disease is usually patently manifest and the ectopic blood formation is minimal in amount. In myelogenous leukemia, of course, the extramedullary myelopoiesis reaches its greatest height. The liver, spleen, lymph nodes and many other organs are invaded by immature and abnormal cells of the granulocyte series. Here again, however, the process is of secondary interest to the clinician. It is true that the body as a whole is widely involved and that thereby irreparable damage is done, but the fundamental disorder is usually clearly apparent, and the diagnostic, therapeutic and prognostic implications are therefore obvious.

At this time we particularly wish to draw attention to another class of patients with myeloid metaplasia in whom this abnormal process assumes major proportions, and in whom it may therefore be responsible for serious errors in diagnosis.

In general, it may be said that these patients show a slowly progressive enlargement of the spleen, and, over a long period of time, present a blood picture which simulates that of myelogenous leukemia, or, more rarely, that of acquired hemolytic jaundice. The fact that splenectomy on

the one hand or irradiation of the spleen on the other is rarely of material benefit and is often followed by serious results indicates clearly the importance of recognizing this symptom-complex and separating it distinctly from those conditions which it may simulate. We have designated this type of myeloid metaplasia of the spleen as agnogenic.*

The literature on extramedullary myelopoiesis is large and confusing. We refer here to two papers only. Hickling² has referred to this type of myeloid metaplasia as "chronic non leukemic myelosis." He presents a review of the cases in the literature and adds 7 of his own. Hickling says, "The diagnosis of chronic non leukemic myelosis depends on the finding of immature red and white cells in the circulating blood without the great increase in the total number of leukocytes characteristic [sic] of leukemia in a patient with massive enlargement of the spleen." As will be apparent from the present study, the diagnosis is by no means so easy, indeed, without both bone marrow biopsy and splenic puncture, it is doubtful whether the diagnosis can be established during life with any degree of certainty.

Hickling's patients showed a progressive enlargement of the spleen and to a less extent of the liver, the constant presence of immature myeloid cells and nucleated red cells in the peripheral blood, basophilia, an increased indirect van den Bergh reaction in the blood serum and spontaneous hemorrhages. In 2 cases there was x-ray evidence of osteosclerosis, and Hickling lays much emphasis on this point, despite the fact that no histological evidence for such sclerosis was forthcoming in his series.

The early symptoms in his cases included abdominal pain, purpura and especially epistaxis or hematemesis. The course of the disease was slow

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This word, derived from the Greek, was suggested by Dr. Robert M. G. Coe, and means of unknown or uncertain etiology.

Of his 7 patients, 5 were alive and in reasonably good health from two to seventeen years from the date of the first symptom. Two patients died, one following a short febrile illness thirteen years after onset, and the other following ligation of the splenic pedicle nineteen years after the first symptoms. Hickling very properly warns against splenectomy, and points out that of the 27 patients reported in the literature who were subjected to this procedure, 15 died within a few days of operation.

Histological examinations were made in only 3 of Hickling's cases. In his second case, a spleneculus removed at operation showed myeloid metaplasia of the pulp without involvement of the Malpighian bodies. In his third case, there was myeloid metaplasia of the spleen and liver and an "intensely active" marrow was found in the lower end of the femur. In his fourth case, he found myeloid metaplasia of the spleen, liver, kidneys, lymph nodes and skin. The bone marrow appeared normal.

Vaughan and Harrison³ have described 2 somewhat similar cases in which there was splenomegaly, increased red-cell fragility, a leukemoid blood picture and eventually a profound anemia. In both cases there was an initial polycythemia. In both there were osteoporosis and extensive fibrosis of the bone marrow. They suggest that "polycythemia vera, megakaryocytic leukemia and myelosclerosis with leukoerythroblastic anemia form a group of closely related conditions." Vaughan, too, warns that "if sclerosis of the marrow is present, x-ray or radium treatment would appear to be contraindicated."

We here report 10 cases proved by histological examinations to have had extensive myeloid metaplasia, especially of the spleen. In all, the onset was insidious and the course slow. In 9, the clinical and hematologic picture simulated that of myelogenous leukemia. One case was erroneously diagnosed as hemolytic jaundice. In all cases, foci of young myeloid cells and megakaryocytes were present in the enlarged and fibrosed spleen and this organ was the chief, though not the only, site of the ectopic blood formation. In the majority of these spleens were found, in addition, isolated clusters of immature red blood cells.

In 3 cases irradiation was applied to the spleen, two of these patients died within a few weeks, the third was not materially helped and died two years later. Three splenectomies were performed. Two of the patients died within six weeks, the third was not improved and died a year later of generalized sepsis.

Autopsies were performed on 6 of the 10 pa-

tients. Splenic punctures and bone-marrow biopsies were carried out on 3 of the remaining cases, and splenectomy on 1.

It is obvious that from a pathological as well as a clinical standpoint the disease from which this symptom complex must most often be differentiated is chronic myelogenous leukemia.

The spleen in agnogenic myeloid metaplasia shows fibrosis varying in degree from slight to marked. Occurring in isolated foci are found hematopoietic cells of various types. Myelocytes and other early forms of the granulocytic series are constantly found. Collections of nucleated red cells or earlier forms of the same series may be present. As a rule megakaryocytes are found, and they are often present in large numbers. The Malpighian corpuscles are preserved, although they may contain an occasional myelocyte or megakaryocyte. Hemosiderin in macrophages may be present, often in considerable amount.

In contrast, a spleen from a case of leukemia that has received no irradiation therapy is characterized by a marked diffuse infiltration by immature cells of the granulocytic series. Young red cells may or may not be present and are seldom a prominent feature. Megakaryocytes are usually seen. The Malpighian corpuscles are as a rule completely obliterated. Infarcts are extremely common. If a case has been irradiated, the histologic picture in the spleen is complicated by the appearance of fibrosis, which may be considerable in amount. In making a differential diagnosis between myeloid metaplasia and myelogenous leukemia on such a spleen, one must depend mainly on the persistence or loss of the Malpighian corpuscles and the absence or presence of infarcts. Thus it is evident that a positive differential diagnosis can usually be made on a section of spleen, but not on a specimen obtained by splenic puncture alone, for in the latter only the separate cytological elements can be studied and not the general architecture of the organ. The evidence obtained from a splenic puncture may, however, be combined with that obtained from bone-marrow and hematological studies to make a definite diagnosis.

The bone marrow from patients with leukemia shows a diffuse infiltration of immature cells of the granulocytic series and a marked decrease in the red-cell series. Fat tissue is usually absent. In myeloid metaplasia, on the other hand, the picture varies greatly. The marrow may appear normal, aplastic, hyperplastic or fibrotic, but in no instance have we seen a change which could be confused with that of leukemia.

The liver in leukemia is characterized by extensive infiltration of the portal areas by young gran-

ulocytes with, in addition, numerous similar cells in the sinusoids. In myeloid metaplasia the picture varies considerably, but usually consists of focal collections in the sinusoids of cells of the granulocytic or red-cell series. Megakaryocytes are commonly present.

The lymph nodes in leukemia usually show a diffuse infiltration of the sinuses and cords with immature granulocytes. Foci of red-cell formation and megakaryocytes may or may not be present. In myeloid metaplasia, isolated collections of young granulocytes, immature red cells and megakaryocytes may occur. The process, however, is not diffuse as it is in leukemia.

In leukemia, there is frequently an infiltration of many other organs, such as the kidney and heart. In myeloid metaplasia on the other hand, the occurrence in these organs of hematopoietic cells is very rare and they are never present in a significant number.

In brief, then, the main difference between the histological picture of leukemia and that of myeloid metaplasia is the diffuse, neoplastic like infiltration in the former, as contrasted with the localized and focal aggregations of hematopoietic cells in the latter. It should be emphasized once more that the bone marrow in myeloid metaplasia never shows the histologic features usually considered diagnostic of leukemia.

Thus it is clear that the pathological differential diagnosis between leukemia and myeloid metaplasia can be made without difficulty on autopsy material or on a spleen that can be examined histologically. It is equally clear that a specimen removed by splenic puncture can merely furnish information as to the presence or absence of hematopoietic cells, and that a differential diagnosis from leukemia cannot be made by this procedure alone. The findings of such myeloid cells in a splenic puncture together with histologic evidence that the bone marrow is not leukemic is, however, sufficient for a diagnosis of myeloid metaplasia.

The following cases illustrate the clinical and pathologic characteristics of the condition.

CASE 1 (No. 745,095). A. M., a 63-year-old woman, was admitted to the hospital on April 18 1934. For 8 weeks she had grown progressively weaker and had suffered from increasing dyspnea, palpitation and nausea. Six weeks before entry she had noticed that her scleras and skin were markedly yellow. One week before admission she had fainted.

Her past history was essentially negative, except that she had been "pale" all her life, and for 6 years prior to entry had noticed a slight though definite yellowish tinge to her skin. The family history was irrelevant. In particular none of the siblings had had jaundice.

Physical examination disclosed a pale, obese and jaun-

diced woman. Both the scleras and skin were definitely icteric. The mucous membranes were pale; the tongue appeared normal. The heart was enlarged 1 cm. to the left of the midclavicular line, and there was a harsh blowing systolic murmur over the entire precordium. The liver was just palpable on inspiration; the spleen was felt 6 cm. below the costal margin.

Both urobilin and urobilinogen tests on the urine were strongly positive. The stools showed the presence of bile and occult blood. The red-cell count was 820,000, the hemoglobin 20 per cent (Sahl) or 3.12 gm. per 100 cc., and the white-cell count 27,000 with 80 per cent polymorphonuclears, 10 per cent myelocytes, 2 per cent stem cells, 6 per cent lymphocytes and 2 per cent monocytes. There were marked poikilocytosis and anisocytosis, and many nucleated red blood cells were seen in the smear. There were 38 per cent reticulocytes. The hematocrit reading was 11.4 per cent. The mean corpuscular volume was 138.8 cu. microns, the mean corpuscular hemoglobin concentration 27.4 per cent and the mean corpuscular hemoglobin 38 micro-microns. Blood platelets were normal in number and appearance. The icteric index was 50. The indirect van den Bergh reaction was positive. Gastric analysis showed no free hydrochloric acid even after the administration of histamine. Fragility tests showed a moderate increase in the susceptibility of the red cells to hemolysis by hypotonic solutions of sodium chloride. Hemolysis began at 0.54 and was complete at 0.30.

A tentative diagnosis of acquired hemolytic jaundice was made.

On May 10 a sternal bone marrow biopsy (JP 108) showed numerous stem cells, erythroblasts, normoblasts and nucleated red cells. A moderate number of granulocytes and megakaryocytes were also present. These findings while not diagnostic, were considered consistent with hemolytic jaundice. Following a blood transfusion the red-cell count rose to 2,100,000, the hemoglobin to 50 per cent (Sahl) or 7.8 gm. per 100 cc. and the reticulocytes to 45 per cent.

On June 12 2 months after admission the fragility of the red cells had further increased hemolysis beginning at 0.66 and being complete at 0.28. The icteric index coincidentally fell to 17. Two further transfusions of blood were given. The patient's strength and general condition improved and on August 30 a splenectomy was performed. The spleen (S-34-3007) weighed 1240 gm. The capsule was smooth and the consistency firm. On section the cut surface was uniformly dark red and neither the Malpighian corpuscles nor trabeculae were prominent. Microscopically there was diffuse fibrosis. Focal areas of myelocytes with rare adult granulocytes were prominent. Numerous foci of red-cell formation were present. In addition, scattered throughout the organ were a large number of megakaryocytes. The Malpighian corpuscles were for the most part well preserved. The histologic picture in no way suggested that usually seen in hemolytic jaundice and often considered diagnostic of that disease.¹ The patient died 3 days after operation.

Autopsy (A 34-494) showed generalized peritonitis, chronic cholecystitis with cholelithiasis, nephrolithiasis, and hepatomegaly. The liver weighed 2050 gm. and microscopically showed hemosiderosis of a moderate degree and some fat in the liver cells. The vertebral sternal and mid femoral marrows were all hyperplastic, and all series of blood cells were well represented with normal maturation. No lymph nodes were examined.

Comment. Here, then, was a patient who, over a period of at least 6 years, had had slight jaundice and weakness and who entered the hospital with the clinical and labora-

tory findings usually considered diagnostic of hemolytic jaundice. Yet the seemingly justifiable splenectomy was followed shortly by death, and the spleen failed to show the lesions of this disease, but revealed instead only marked myeloid metaplasia

CASE 2 (No 566,172) E H, a 52-year-old man, entered the hospital on July 2, 1928. Twelve years prior to entry he began to feel generally weak and "sick." At the same time there developed on the right great toe and on the dorsum of the left foot small areas of gangrene, which cleared gradually when treated with "dilute carbolic acid," in spite of the fact that amputation had been deemed necessary by an eminent specialist in vascular diseases. At the same time, the patient was told that his blood was "too thick," and he was advised to follow a special diet to remedy this defect. Shortly thereafter he noticed that his hands and feet constantly felt cold. The general weakness gradually increased, and in 1925 he was sufficiently ill to be confined to bed for a period of 2 months. His weakness had become extreme and he was slightly dyspneic, even at rest. It was at this time that the enlarged spleen was first noted.

The past history was uneventful, except that he had had malaria at the age of 18.

On entry to the hospital in 1928, physical examination showed a moderate degree of pallor of the mucous membranes. There was no lymphadenopathy. The lungs were clear. The heart was normal in size, but the sounds were of poor quality and there were many ventricular extrasystoles. The blood pressure was 120/70, the peripheral vessels were thickened and sclerotic. The abdomen was markedly distended and was almost filled by the enormously enlarged liver and spleen, the former reaching to the level of the umbilicus, the latter descending into the pelvis. Both organs were extremely hard.

The red-cell count was 3,400,000, the hemoglobin 83 per cent (Sahl) or 12.95 gm per 100 cc., and the white-cell count 23,700, with 79 per cent polymorphonuclears, 6 per cent metamyelocytes, 7 per cent myelocytes, 5 per cent lymphocytes and 3 per cent monocytes. The platelets were normal. X-ray films of the long bones showed no abnormalities. The basal metabolic rate was +47 per cent, and a blood Hinton test was positive. Careful questioning revealed no history of luetic infection.

A diagnosis of myelogenous leukemia was made, and 200 r was given over the spleen. As a result of this small dose of x-ray, the white-cell count dropped to 8200, the differential count remaining essentially the same, and the basal metabolic rate fell to +19 per cent. Neither the liver nor the spleen decreased in size. Further x-ray treatment was withheld, and the patient left the hospital somewhat disgruntled because he had not had his "full share" of irradiation.

He returned, however, 4 years later and was readmitted on May 12, 1932, again complaining of weakness, which had become so marked that he was unable to work. In the 4 years since his discharge he had had a number of brisk nosebleeds, and latterly had noted edema of the ankles toward the end of the day. He had received no specific therapy.

At the time of the second admission the patient was found to be dyspneic, even at rest. There had been considerable weight loss. The liver and spleen were still grossly enlarged and very hard. The red-cell count was 1,900,000, the hemoglobin 44 per cent (Sahl) or 6.86 gm per 100 cc., and the white-cell count 6300, with 50 per cent polymorphonuclears, 19 per cent myelocytes, 8 per cent promyelocytes, 2 per cent stem cells, 6 per cent monocytes and 15 per cent lymphocytes. The platelets were

definitely diminished in number and 5 nucleated red cells were seen on counting 100 white cells.

On May 16 200 r was given to the spleen, followed by a severe reaction with dizziness, vomiting, great weakness and a severe nosebleed. On May 23 another dose of 200 r was given over the spleen, with marked diminution in its size but very little amelioration of symptoms. Physical examination revealed the presence of ascites, and 800 cc. of thin, blood tinged fluid was withdrawn from the peritoneal cavity. The patient failed rapidly. The red-cell count fell to 1,070,000, the hemoglobin to 25 per cent (Sahl) or 3.9 gm per 100 cc., and the white-cell count to 3050, with the differential count essentially as before. The patient died June 27, 1932, 16 years after the first symptom of his disease and 5 weeks after his final x-ray therapy.

Autopsy (PA-32 65) showed a small amount of clear fluid in both pleural cavities and fibrous adhesions at both lung bases. The heart was normal. In the peritoneal cavity was 900 cc. of bloody fluid. The spleen weighed 4600 gm and cut with greatly increased resistance. The liver weighed 4400 gm, and similarly was very firm. There was definite enlargement of the mediastinal, para-aortic and mesenteric nodes. Grossly the bone marrow appeared normal.

Microscopically the spleen showed marked fibrous thickening of the capsule and pulp. There were many isolated foci of myelocytes. Nucleated red cells were numerous, but less mature forms were few. Megakaryocytes were rare. Phagocytosis of red cells by macrophages was a prominent feature. The Malpighian corpuscles were intact. In the liver, there were scattered immature cells of the granulocytic series in the sinusoids. Neither nucleated red cells nor megakaryocytes were present. The mediastinal and abdominal lymph nodes contained isolated foci of stem cells and myelocytes. Numerous nucleated red cells were present, and a few clumps of erythroblasts. There were many megakaryocytes. The lymph sinuses contained a few macrophages filled with red cells. The vertebral bone marrow showed a considerable degree of fibrosis. A few stem cells and myelocytes were present. There were large numbers of nucleated red cells and rare less adult forms. Megakaryocytes were few. A moderate number of macrophages containing numerous red cells were noted. The histological picture was, therefore, in no way suggestive of leukemia, and what little activity remained appeared to be confined mainly to the red-cell series.

Comment This patient for many years had a greatly enlarged liver and spleen and was found to have a peripheral blood picture very suggestive of myelogenous leukemia. Apparent confirmation of this diagnosis was found in the elevated basal metabolism. Yet a very small amount of radiation produced a rather marked fall in the white-cell count, and subsequent moderate irradiation to the spleen was followed by rapidly developing anemia and death. Autopsy showed extramedullary myeloid metaplasia of the spleen and a fibrotic bone marrow. There was no evidence of leukemia.

CASE 3 (No H 17 199.93) W R., a 60-year-old man, was first seen on May 2, 1917. For 20 years he had complained of postprandial distress in the left upper quadrant, for "many years" he had noticed a mass in the same region. For 12 months prior to entry he had felt tired and worn out. Six months later his own doctor had substantiated the fact that his spleen was enlarged.

The past and family histories were irrelevant. On entry to the hospital, physical examination was es-

essentially normal, except that the liver was just palpable on inspiration and the spleen extended 7 cm. below the umbilical line on quiet respiration.

The red-cell count was 4,830,000 the hemoglobin 90 per cent (Sahli) or 13.9 gm. per 100 cc., and the white cell count 13,100 with 70 per cent polymorphonuclears 10 per cent myelocytes, 2 per cent stem cells, 4 per cent monocytes and 14 per cent lymphocytes. Five nucleated red cells were seen while counting 100 white cells, and there was marked anisocytosis, poikilocytosis and polychromatophilia. The platelets were greatly decreased in number. A diagnosis of myelogenous leukemia was made, and 6120 mc. hr. of radium was applied over the spleen at a distance of 5 cm. with 5 mm. of lead screening. Five days later the hemoglobin had fallen to 78 per cent, and the white-cell count to 6000. The differential count was essentially as before. The spleen was slightly but definitely smaller than on admission.

No further therapy was undertaken but on June 7 1 month after the initial radium treatment, the red-cell count had fallen to 1,700,000 the hemoglobin to 35 per cent and the white-cell count to 4000. A differential count revealed 54 per cent polymorphonuclears 14 per cent myelocytes, 14 per cent stem cells and 18 per cent lymphocytes. The reticulocytes were but 0.1 per cent. The platelets had become still further reduced in number. Definite jaundice was noted for the first time. The spleen continued to recede, but the patient, after a short interval of slightly improved health failed rapidly and died on July 19 1917 6 weeks after radium treatment.

Autopsy (HA 17-85) showed the spleen extending to the umbilicus and weighing 2200 gm. and the liver reaching 6 cm. below the costal margin and weighing 2700 gm. There was an enlargement of the lymph nodes in any region. Microscopically the spleen showed a marked diffuse fibrosis. Fairly numerous foci of stem cells, myelocytes and more adult granulocytes were present. There was no red-cell formation and there were no nucleated red cells. A considerable number of megakaryocytes were noted. The Malpighian corpuscles were preserved, but were diminished in size and often contained an occasional myelocyte. There were a moderate number of lymphocytes and plasma cells in the pulp and in addition a considerable number of hemosiderin-laden macrophages. The sinusoids of the liver contained a moderate number of myelocytes and megakaryocytes, but no nucleated red cells. The bone marrow from the vertebrae, sternum femur and tibia was almost completely aplastic, with but a few isolated cells of the granulocytic series present.

Comment. This case also presented, when first seen the clinical and hematologic features not inconsistent with a diagnosis of myelogenous leukemia. Irradiation to the spleen however was followed, as in Case 2, by rapid decline and early death. Autopsy showed an aplastic fatty marrow and marked myeloid metaplasia of the spleen. It seems not improbable that in this case and in the preceding one the greatest part of the blood formation was taking place in the spleen and that irradiation of this organ with consequent destruction of immature cells led to a rapidly developing anemia leukopenia and death.

CASE 4 (No. T 959) L. J., a 51 year-old white woman was admitted to the hospital on September 22 1931. In 1901 she had had tertian malaria. In 1906 she had had a severe attack of jaundice associated with anorexia vertigo headache and vomiting. This illness lasted for 2 months, and in the next 17 years she had three other similar episodes. In 1915 she was operated on for acute appendicitis. No mention of the spleen was made in the operative

notes, but it was stated that the ovaries were under developed and subsequently she ceased to menstruate. In 1928 eight years prior to admission the patient suffered from a profuse hemorrhage following the extraction of an abscessed tooth. In 1936 she vomited a large amount of blood on two occasions. An abdominal exploration was done. A gastric ulcer was said to have been found and a posterior gastroenterostomy was performed. In 1929 the patient complained of soreness of the tongue and loss of sensation of taste. From that time on she did not feel well and complained of attacks of dizziness and vomiting.

The family history was irrelevant.

Physical examination on entry to the hospital in 1931 showed a middle-aged, pale woman in no apparent distress. There was no jaundice. The tongue was markedly atrophic and somewhat redder than normal. The spleen was found 4 cm. below the costal margin. The liver could not be felt. The red-cell count was 5,300,000 the hemoglobin 57 per cent (Sahli) or 8.89 gm. per 100 cc. and the white-cell count 28,500 with 70 per cent polymorphonuclears, 1 per cent metamyelocytes 10 per cent myelocytes, 2 per cent stem cells, 11 per cent lymphocytes, 3.5 per cent monocytes and 2.5 per cent basophils. Five nucleated red blood cells were seen while counting 100 white cells. The reticulocytes were 5 per cent. The platelets were greatly increased, and many nucleated reds were seen in the smear. Gastric analysis showed no free hydrochloric acid even after the administration of histamine, and the gastric index was 9. The red-cell fragility began at 0.52 and was complete at 0.24.

A diagnosis of early myelogenous leukemia or atypical hemolytic jaundice was made, and the patient was put on massive doses of iron and ammonium citrate. Possibly as a result of this therapy the red-cell count rose to 7,600,000 and the hemoglobin to 110 per cent (Sahli) or 17.16 gm. per 100 cc. The white-cell count remained elevated, and the smear continued to show a definite though varying per cent of myelocytes, myeloblasts and nucleated red cells.

On December 9 the red-cell count was 7,680,000 the hemoglobin 104 per cent (Sahli) or 16.22 gm. per 100 cc. and the white-cell count 28,000 with 80 per cent polymorphonuclears, 3 per cent myelocytes, 1 per cent stem cells 3 per cent basophils, 1 per cent monocytes, and 12 per cent lymphocytes. The platelets were markedly increased in number.

A biopsy (S-33-407) of the sternal marrow in February 1933 showed patchy fibrosis. In the fibrotic areas, hematopoietic cells were few. Elsewhere the hematopoietic tissue was cellular and was composed of the granulocytic series and numerous megakaryocytes. Red-cell formation was comparatively slight. The patient continued to complain of vague paresthesias of the hands and feet, sore tongue and malaise, but her general condition remained fairly good.

In the latter part of 1932, the immature white cells in the peripheral blood became more numerous. On October 17 1932 the red-cell count was 5,320,000, the hemoglobin 91 per cent (Sahli) or 14.20 gm. per 100 cc., and the white-cell count 9700 with 81 per cent polymorphonuclears, 3 per cent eosinophils 1 per cent basophils, 14 per cent myelocytes and 1 per cent stem cells. Five nucleated red cells and 1 normoblast were seen in counting 100 white blood cells. The mean corpuscular volume was 86.2 cu. microns, the mean corpuscular hemoglobin concentration 32.3 per cent, the mean corpuscular hemoglobin 26.7 micro-microgm. and the hematocrit reading 45.9 per cent.

In November 1935 the patient developed generalized joint pains, and x-ray films showed some hyperostotic arthritis about the right knee joint. She had failed con-

siderably in strength. The peripheral blood picture remained essentially as before, and the spleen was now palpable nearly to the umbilicus and was very hard in consistency.

The course of the disease slowly continued to advance and early in April, 1937, the patient had an attack of very severe pain in the right great toe, associated with marked redness and tenderness. The blood uric acid was 4.2 mg per 100 cc. The pain subsided without specific therapy in the course of a week.

In June, 1938, a second sternal bone marrow biopsy (S-38-1753) was performed. The bone marrow showed a greater degree of fibrosis than that seen in the first biopsy specimen. Scattered myelocytes, polymorphonuclear leukocytes and megakaryocytes were present, but were few in number. No red-cell formation was evident.

From this time on the patient's condition became progressively worse. There were no further hemorrhages, yet by January, 1939, the red-cell count had fallen to 3,700,000 and the hemoglobin to 50 per cent (Sahli) or 7.80 gm per 100 cc. The white-cell count was 16,500, with 51 per cent polymorphonuclears, 2 per cent basophils, 3 per cent metamyelocytes, 13 per cent myelocytes, 4 per cent stem cells, 8 per cent monocytes and 19 per cent lymphocytes. The red-cell diameter was 6.84 microns. Forty-six nucleated red cells and 3 normoblasts were seen in counting 100 white cells. The platelets were markedly decreased in number. At this time, a splenic puncture was done and large numbers of myelocytes, promyelocytes, stem cells, nucleated red cells, normoblasts, erythroblasts and megakaryocytes were found.

Comment. This patient has shown for a period of at least 8 years features suggestive of myelogenous leukemia, namely an enlarged spleen, an elevated white-cell count and the presence in the peripheral blood of notable numbers of myelocytes, nucleated red cells and occasional stem cells. Certain findings such as the slightly increased red-cell fragility and the subclinical icterus were reminiscent of hemolytic jaundice. At one period when the red-cell count was over 7,000,000 polycythemia vera was considered as a distinct diagnostic possibility. Yet on two occasions bone marrow biopsy failed to substantiate any of these diagnoses and splenic puncture revealed the presence of myeloid metaplasia. The onset of the disease was insidious; indeed, it is difficult to state with any degree of assurance when the condition started, though it is probable that the profuse hemorrhage following a tooth extraction 16 years previously should be taken as the first evidence of its existence.

In view of the disastrous results of splenectomy in Case 1, which had been diagnosed as hemolytic jaundice, and the apparently unfortunate effects of irradiation in Cases 2 and 3, which had erroneously been diagnosed as myelogenous leukemia, it is perhaps fortunate that this patient was treated symptomatically only.

DISCUSSION

From a clinical and hematological point of view, these cases of agnogenic myeloid metaplasia of the spleen are most frequently confused with myelogenous leukemia in the subleukemic phase. More rarely they simulate classical myelogenous leukemia with comparatively high total white-cell counts. Still more rarely acquired hemolytic jaundice is imitated. In view of the apparent wisdom of treating these cases symptomatically only, the question naturally arises as to how they

may be distinguished during life from these other more definite clinical entities. It is already apparent that such differentiation can, with assurance, be made only by combined hematological, clinical and pathological studies.

The total number of white cells in the peripheral blood varies, though it is usually moderately increased. Varying numbers of myelocytes and stem cells constantly occur in the peripheral blood, but the hematologic hiatus so suggestive of acute leukemia is not seen. The peripheral blood picture by itself is not distinctive.

The anemia, which may be normocytic, microcytic or macrocytic, varies in degree. It is usually moderate, rarely extreme. Except in those cases simulating hemolytic jaundice, the reticulocytes are not greatly increased. Nucleated red cells and more rarely normoblasts are found almost constantly in the peripheral blood stream. In certain cases some degree of polycythemia may exist in the early stages of the disease. It is possible that some cases of so-called polycythemia may actually belong in this class. The platelets may be increased, normal or decreased. The onset is insidious, the course slowly progressive.

The commonest symptoms are weakness, joint pains, anorexia, abdominal pain, epistaxis and loss of weight. The spleen is enlarged, often greatly so, and the liver is frequently increased in size. Both organs are of very firm consistence. Generalized lymphadenopathy does not occur. Slight jaundice is common.

During life, the condition may be suspected when a patient with a large spleen has had, over a considerable period of time, a subleukemic peripheral blood picture, together with occasional nucleated red cells in the smear. This suspicion becomes a probability if the spleen is very large and hard, slight jaundice is present, the course of the disease is slow and the total white-cell count is comparatively low. The disease may be properly diagnosed when, under these conditions, bone-marrow biopsy fails to reveal the pathologic changes characteristic of leukemia and splenic puncture shows the presence of megakaryocytes and immature cells of both the red-cell and white-cell series. Should the peripheral blood be suggestive and the bone marrow prove to be non-leukemic, splenic puncture is necessary in order to rule out those conditions in which splenectomy might be indicated, if only as a last resort.

The nature of the condition appears at present entirely obscure. For one reason or another, the bone marrow seems unable to form and deliver the requisite number of blood cells, but in view of the fact that at the height of the disease or

at death the bone marrow may be on histological examination normal, fibrotic, fatty or hyperplastic, it is by no means certain that bone marrow failure is the primary lesion. Vaughan⁴ has suggested that the "leukoerythroblastic hyperplasia" and the marrow sclerosis are processes which occur simultaneously in response to a single stimulus. It is difficult to reconcile this hypothesis with the extremely varied marrow pictures, which do not always include sclerosis, and for

neither case was there any improvement in the peripheral blood picture, and both patients died within a year.

In 4 cases a definite diagnosis of myelogenous leukemia was made. One patient was treated symptomatically and died three years from onset. The three others were given x-ray treatment. Two died within six weeks, in the third case no real benefit occurred and the patient succumbed to bronchopneumonia two years later.

TABLE I

| CASE NO. | AGE | SEX | DURATION | | | RED- BLOOD-CELL COUNT $\times 10^6$ | WHITE BLOOD-CELL COUNT $\times 10^6$ | TREATMENT | CONDITION OF BONE MARROW | ICTERIC INDEX | RETICULO- CYTES % |
|----------|-----|-----|------------|-------------|-------------------------|--|---|-------------|-----------------------------|------------------|-------------------------|
| | | | TO DATE | TO DEATH | AFTER TREAT- MENT | | | | | | |
| 1 | 63 | F | — | 6 | 3 days | 0.8-1.1 | 27.0-25.0 | Splenectomy | Hyperplastic | 50-17 | 38-45 |
| 2 | 52 | M | — | 16 | 5 wk. | 3.4-4.0 | 23.0-3.0 | X-ray | Fibrotic | — | — |
| 3 | 60 | M | — | 115 | 6 wk. | 4.5-1.7 | 13.0-4.0 | X-ray | Aplastic | — | 0.1 |
| 4 | 51 | F | 18 mo. | — | — | 5.3-6-3.7 | 23.0-16.0 | Symptomatic | Fibrotic | 7 | 2.8 |
| 5 | 49 | M | 2 | — | — | 3.9-4.1 | 8.6-5.0 | Symptomatic | Fibrotic | 10-6 | 3.4 |
| 6 | 30 | F | — | 21 | 1 y. | 3.1-5.0 | 7.0-33.0 | Splenectomy | Normal | 6 | 5 |
| 7 | 70 | P | — | 13 | — | 2.0-0.92 | 18.9-1.3 | Symptomatic | Fibrotic | 3 | 10 |
| 8 | 2 | M | — | 7 | mo. | 3.9-3.0 | 12.0-70.0 | Splenectomy | — | 9 | 1-2 |
| 9 | 64 | F | — | 5 | 3 y. | 3.9-2.5 | 11.0-36.0 | X-ray | Osteoclastic | — | 1-7 |
| 10 | 52 | M | 22 mo. | — | — | 7.5-4.5 | 14.0 | Symptomatic | Fibrotic | 3 | 3.1 |

This patient had had small amount of irradiation 4 years previously

the present we must rest content with the knowledge that massive extramedullary myelopoiesis may occur, and that more definite hematologic disorders may thereby be simulated.

CONCLUSIONS

A total of 10 cases of agnogenic myeloid metaplasia are presented (Table I).

In all instances, the spleen showed marked myeloid metaplasia, namely scattered foci of immature red and white blood cells and megakaryocytes throughout a slightly or markedly fibrosed organ. In the cases that came to autopsy there were occasionally found similar foci of ectopic blood formation in the liver and lymph nodes. There was not the uniform distribution of immature cells seen in the organs of leukemic patients, and immature cells of the red-cell series were present in greater numbers than in that disease. The Malpighian corpuscles were for the most part uninvolved. The bone marrow was variously fibrotic, hyperplastic, aplastic or normal. In no instance was it even suggestive of leukemia.

In 3 cases the diagnosis of myeloid metaplasia seemed clearly established and treatment was symptomatic only. All three patients are alive. In 1, a diagnosis of hemolytic jaundice was made and splenectomy was performed. The patient died three days postoperatively.

In 2 cases no definite diagnosis was made, but splenectomy was advised and carried out. In

The average duration from onset to date of death was 10.8 years. In 4 cases the symptoms dated back over fifteen years.

The chief symptoms were weakness, abdominal distress and a hemorrhagic tendency.

The principal findings were a progressive enlargement of the spleen, a moderately elevated or slightly depressed white-cell count and the constant presence of immature red and white cells in the peripheral blood.

In view of the apparent uselessness and possible harm arising from irradiation or splenectomy, it is of the greatest importance to recognize this condition and to undertake only symptomatic and supportive treatment when it has been proved to be present.

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ABSTRACTS OF THE REMAINING FIVE CASES

CASE 5 (No. 914,393). M. G., a 49-year-old man, was admitted on October 11, 1937 with the complaint that for 4 months he had noticed a painless lump in the left upper quadrant of the abdomen. There were no other symptoms.

On physical examination, the spleen was 14 cm. and the liver 8 cm. below the costal margin. The red-cell count was 3,980,000, the hemoglobin 70 per cent (Sahli) or 10.92 gm. per 100 cc., and the white-cell count 8600 with 18 per

cent polymorphonuclears, 22 per cent young polymorphonuclears, 5 per cent metamyelocytes, 21 per cent myelocytes, 3 per cent stem cells, 25 per cent lymphocytes and 6 per cent monocytes. The platelets were decreased in number, and in counting 100 white blood cells 8 nucleated red cells and 1 normoblast were seen. Both anisocytosis and poikilocytosis were marked. The hematocrit reading was 33.3 per cent, the mean corpuscular volume 83.6 cu microns, the mean corpuscular hemoglobin concentration 33.8 per cent and the mean corpuscular hemoglobin 27.4 micro-microgm. The icteric index was 10. On two occasions the basal metabolic rate was +50 per cent.

A sternal bone marrow biopsy (S-37-3415) showed extensive fibrosis. Very rare scattered myelocytes and megakaryocytes were found in the dense connective tissue. There was no evidence of red-cell formation. No specific therapy was given. A splenic puncture performed on November 10, 1938, showed a marked degree of myeloid metaplasia. To date the patient's condition has remained essentially the same.

CASE 6* G. C., a 30-year-old woman, was first seen on March 21, 1934. Seventeen years previously a physician had found her spleen enlarged. She had remained in fairly good health until 1930, when she began to complain of increasing weakness and some bleeding from the gums. Physical examination in March, 1930, revealed a spleen which descended to the level of the umbilicus. The red-cell count was 3,190,000, the hemoglobin 60 per cent (Sahl) or 9.3 gm. per 100 cc., and the white-cell count 7000, with 65 per cent polymorphonuclears, 10 per cent young polymorphonuclears, 3 per cent myelocytes, 17 per cent lymphocytes, 2 per cent basophils and 3 per cent eosinophils.

Early in 1935 the patient began to suffer from attacks of right lower quadrant pain, and in June, 1936, the white-cell count had risen to 53,000, with 53 per cent polymorphonuclears, 17 per cent metamyelocytes, 3 per cent myelocytes, 6 per cent eosinophils, 1 per cent basophils and 20 per cent lymphocytes. The red cell count was 4,100,000. The reticulocyte count was 5 per cent, and 6 nucleated red cells were seen in counting 100 white blood cells.

Early in 1937 a splenectomy was performed. The spleen (S-36-3890) weighed 1100 gm. and showed marked fibrosis and myeloid metaplasia. Following operation, there was no essential change in the patient's condition. She eventually developed a bacteremia and septicemia from which she died in the middle of 1938.

Autopsy (S-38-2553) revealed the usual picture of staphylococcal septicemia with multiple abscesses of the lungs. Microscopically the liver showed a slight increase in the periportal connective tissue. There were a moderate number of myelocytes in the portal areas and in the sinusoids. No nucleated red cells or evidence of red-cell formation was seen. Megakaryocytes were present in large numbers in the sinusoids. The bone marrow showed no fat tissue, but was filled with hematopoietic tissue. Although the marrow was highly cellular, it in no way suggested leukemia.

CASE 7 (No. 692,414) A. B., a 70-year-old woman, was admitted on December 7, 1932. In 1930 she had noticed increasing fatigability and anorexia. In 1931, the weakness increased and she became increasingly dyspneic on exertion. On physical examination in 1931 the mucous membranes were pale. The spleen was palpable 2 cm. below the costal margin. The red-cell count was 2,000,000, the hemoglobin 28 per cent (Sahl) or 4.37 gm. per 100 cc., and the white-cell count 18,900, with 46 per cent poly-

morphonuclears, 7 per cent myelocytes, 35 per cent lymphocytes, 8 per cent monocytes, 3 per cent basophils and 1 per cent eosinophils. The reticulocyte count was 10 per cent, and 10 nucleated red cells were seen on counting 100 white blood cells. A fragility test showed a trace of hemolysis at 0.56 and complete hemolysis at 0.30. The hematocrit reading was 15.6 per cent, the mean corpuscular volume 78 cu microns, the mean corpuscular hemoglobin concentration 28 per cent, and the mean corpuscular hemoglobin 21.9 micro-microgm.

Throughout her short stay in the hospital, the patient ran an irregular temperature from 99 to 101°F. She failed rapidly, and on January 30, 1933, the red-cell count had fallen to 925,000, the hemoglobin to 13 per cent (Sahl) or 2.03 gm. per 100 cc., and the white-cell count to 1300. The differential count remained essentially the same. The patient died February 3, 1933.

Autopsy (A 33-109) revealed nothing of note grossly, with the exception of chronic cholecystitis with cholelithiasis. The spleen weighed 410 gm. Microscopically it showed a slight degree of diffuse fibrosis and marked myeloid metaplasia. The liver weighed 1340 gm. and grossly was not remarkable. A moderate number of stem cells occurred scattered and in clumps in the sinusoids. Several foci of immature red cells and fairly numerous megakaryocytes could be recognized also in the sinusoids. The vertebral bone marrow had patchy areas of fibrosis. Where the fibrosis was marked, only a few hematopoietic cells were present, elsewhere they were numerous. Of the granulocytic series, stem cells, myelocytes and adult granulocytes were numerous. The red-cell series was represented by clumps of stem cells and erythroblasts, occasional normoblasts and rare nucleated red cells. Megakaryocytes were numerous, many of them young. A considerable amount of hemosiderin was present, especially in the fibrotic areas. The sternal bone marrow showed a moderate amount of fibrosis.

CASE 8 (No. T-988) S. S., a 22-year-old medical student, noted during routine classwork in June, 1926, that his own blood smear was abnormal, in that the red cells showed considerable variation in size and shape and that myelocytes were present. In 1925, on routine physical examination, it had been noted that his spleen was easily palpable.

Physical examination in 1926 showed that the spleen was palpable 2 cm. below the left costal margin. Otherwise, the physical examination was normal. The red-cell count was 3,900,000, the hemoglobin 83 per cent (Sahl) or 12.95 gm. per 100 cc., the white-cell count 12,000, with many immature white blood cells. The reticulocytes were 1.5 per cent and the fragility was normal. The white-cell count rose steadily to 40,000, with many myelocytes. The red-cell count rose coincidentally to 4,500,000, and the hemoglobin to 100 per cent (Sahl) or 15.6 gm. per 100 cc.

For the next five years the patient was lost track of, but during this time the spleen gradually increased in size. He was admitted to the hospital on September 12, 1932. The physical examination was normal except that the spleen descended 12 cm. below the costal margin. The red-cell count was 4,500,000, the hemoglobin 80 per cent (Sahl) or 12.48 gm. per 100 cc., and the white-cell count 15,000, with 70 per cent polymorphonuclears, 5 per cent metamyelocytes, 1 per cent myelocytes, 1 per cent stem cells, 3 per cent monocytes and 20 per cent lymphocytes. The hematocrit reading was 42.2 per cent, the mean corpuscular volume 93.8 cu microns, the mean corpuscular hemoglobin 27.7 micro-microgm and the mean corpuscular hemoglobin concentration 29.6 per cent. A fragility test showed that

*For the report of this case we are indebted to Dr. Arthur W. Marsh of Worcester, Massachusetts.

hemolysis began at 0.56 and was complete at 0.30 The icteric index was 9

On October 28 splenectomy was performed. The spleen weighed 745 gm. Microscopically there were focal collections of stem cells and myelocytes. Numerous foci of red-cell formation were present. The number of megakaryocytes was considerable. The Malpighian corpuscles were well preserved. Lymphocytes and plasma cells were scattered through the pulp.

The patient's condition remained good, but the red-cell count fell to 3,000,000 and the white-cell count rose to 70,000 on November 20, with 80 per cent polymorphonuclears, 7 per cent metamyelocytes, 3 per cent myelocytes and 10 per cent lymphocytes. The platelets were normal. An occasional nucleated red cell was seen. The patient's strength gradually failed and he died of bronchopneumonia on January 11 1933. No autopsy was obtained. It is unfortunate that in this case bone-marrow biopsy was unsatisfactory.

CASE 9 (No. 824,534) D. W., a 64-year-old woman, was admitted to the hospital on July 2, 1931 complaining of weakness of 4 months duration. Two years previously she had had a severe attack of weakness, and at this time it had been noted that the spleen was enlarged.

Physical examination was essentially normal, except for a spleen which extended 7 cm. below the costal margin. The red-cell count was 3,830,000 the hemoglobin 71 per cent (Sahli) or 11.08 gm. per 100 cc., and the white-cell count 11,900 with 17 per cent reticulocytes. No record of a differential count was made, but it was noted that many immature granulocytes were present. There was no free hydrochloric acid in the gastric juice. A diagnosis of myelogenous leukemia was made and the patient was put on Fowler's solution by mouth. She left the hospital however and was not seen again until January 31 1935 when she was readmitted for increasing weakness and nervousness.

Physical examination at that time revealed a hard nontender spleen extending to the level of the umbilicus. Otherwise the physical examination was normal. The red-cell count was 3,060,000 and the hemoglobin 57 per cent (Sahli) or 8.89 gm. per 100 cc. The white-cell count was 17,000 with 65 per cent polymorphonuclears, 2 per cent metamyelocytes, 17 per cent myelocytes, 12 per cent lymphocytes, 1 per cent eosinophils and 2 per cent basophils.

The patient was given 400 r to the spleen. Five weeks later the white-cell count had risen to 40,000.

She was readmitted on March 5 1934. At this time the spleen had increased still further in size, now reaching to the iliac crest, and the liver was 5 cm. below the costal margin. The red-cell count was 3,940,000 the hemoglobin 68 per cent (Sahli) or 10.61 gm. per 100 cc., and the white-cell count 28,600 with 13 per cent polymorphonuclears, 41 per cent young polymorphonuclears, 6 per cent myelocytes, 6 per cent promyelocytes, 5 per cent stem cells, 4 per cent basophilic myelocytes, 4 per cent basophils, 1 per cent monocytes and 11 per cent lymphocytes.

The final admission was on May 28 1936. The patient had lost much weight and was somewhat dyspneic. There were signs of bronchopneumonia at the bases of both lungs. The liver and spleen were as before. The temperature was 100.4 F., the pulse 100 and the respirations 30.

The red-cell count was 2,500,000 the hemoglobin 43 per cent (Sahli) or 6.71 gm. per 100 cc. and the white-cell count 36,000 with 25 per cent polymorphonuclears, 12 per cent lymphocytes, 10 per cent monocytes, 48 per cent myelocytes 2 per cent basophilic myelocytes and 3

per cent stem cells. The patient died the day of entrance.

Autopsy (A 36311) showed lobar pneumonia splenomegaly hepatomegaly with hemosiderous chelicitis and osteosclerosis of the vertebral and sternal marrow. The spleen weighed 1570 gm. The liver weighed 2480 gm. The lumbar and sternal marrow were pinkish gray and hard. The tibial and femoral marrow were yellowish white. Microscopically the spleen showed a moderate degree of diffuse fibrosis. Many focal collections of stem cells myelocytes and adult granulocytes were present. There was no evidence of red-cell formation, nor were any immature forms of this series noted. Megakaryocytes were numerous. The Malpighian corpuscles were smaller than normal, and many contained a few stem cells and megakaryocytes. Hemosiderin-filled macrophages were present in large numbers in the pulp. The sinusoids of the liver contained numerous stem cells, immature granulocytes and a considerable number of megakaryocytes. No evidence of red-cell formation was present, nor were any immature red cells seen. Large amounts of hemosiderin occurred in the liver cells, the Kupffer cells, and in macrophages in the portal areas. The tracheo-bronchial lymph nodes contained some myelocytes and polymorphonuclear leukocytes and also some megakaryocytes, but no immature red cells. There was much hemosiderin in the stromal fibroblasts and the endothelial cells of the sinusoids. The sternal bone marrow showed an increased number of bony trabeculae and areas of connective tissue. Large numbers of fat cells were present. There were foci of the granulocyte series with normal maturation. No evidence of red-cell formation was present. Megakaryocytes were fairly numerous. Large amounts of hemosiderin were present. The vertebral and rib marrow presented essentially the same picture. The femoral and tibial marrow contained much fat tissue and a few myelocytes, polymorphonuclear leukocytes, lymphocytes and macrophages.

CASE 10 (H. 39 1280) L. B. a 52-year-old man, was admitted to the hospital on October 16 1939 with a chief complaint of abdominal distress. His past and family histories were irrelevant, except that in recent years he had suffered a good deal from "rheumatism" of the knees and ankles. In February 1938 he noticed that he was losing weight and that he tired easily. Three months later he began to have dyspnea on exertion. At about the same time he noted vague abdominal distress. His abdomen gradually became distended and in July 1939 he noted a hard, nontender mass in the left upper quadrant. At this time he visited an outside hospital where the red-cell count was found to be 7,590,000 the hemoglobin 90 per cent (Sahli) or 14.0 gm. per 100 cc. and the white-cell count 14,750. The differential count was essentially normal. The spleen at that time was grossly enlarged, extending to the midline and to the iliac crest. Otherwise the physical examination was normal.

On entry to the hospital in October 1939 physical examination disclosed a hard smooth spleen extending to the right of the midline and into the false pelvis. The liver was palpable 3 cm. beneath the costal margin. There was evidence of considerable recent weight loss. The red-cell count was 4,800,000 and the white-cell count 14,500 with 37 per cent polymorphonuclear neutrophils 9 per cent young polymorphonuclears 4 per cent metamyelocytes, 13 per cent myelocytes 3 per cent stem cells, 13 per cent monocytes, 10 per cent lymphocytes, 3 per cent basophils, 1 per cent eosinophils and 7 per cent of abnormal cells closely resembling megakaryocytes. A rare normoblast was

seen Two weeks later the hematocrit reading was 29 per cent, the mean corpuscular volume 61 cu microns, the mean corpuscular hemoglobin concentration 34 per cent and the mean corpuscular hemoglobin 23.7 micro-micromg. The red cell diameter was 6.04 microns. Fragility tests showed that there was a moderate increase of the red cells to hemolysis, which began at 0.52 and was complete at 0.32.

A biopsy (S-39-3327) of the sternal marrow showed very extensive fibrosis, but here and there were scattered

cells of the hematopoietic series. The marrow (S-39-3432) from the mid tibia was largely fatty, but here and there areas of fibrosis occurred, containing small collections of immature blood cells of all types. Young blood cells were not seen in the fatty areas. A specimen (S-39-3422) removed at splenic puncture showed marked fibrosis, large numbers of megakaryocytes and many nucleated red cells, normoblasts, myelocytes and stem cells. A definite diagnosis of agnogenic myeloid metaplasia was made.

PENTOTHAL SODIUM ANESTHESIA FOR ENCEPHALOGRAPHY*

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ENCEPHALOGRAPHY, when first described by Dandy¹ (1919), was intended as an aid in the diagnosis of hydrocephalus and brain tumor. The introduction of air through the lumbar route was little utilized until 1921, when it was re-introduced and its importance emphasized by Bingle and Wideroe.² Since then its use has been extended to the investigation of practically every disease within the cranial cavity, and it has become an indispensable adjunct to neurological diagnosis.

Encephalography can be one of the most drastic diagnostic procedures patients have to undergo, serious symptoms and occasionally death can occur, and in fact have occurred, during this procedure and after its completion. When encephalography is done under local anesthesia after preliminary sedation "the usual symptoms in the order of their appearance are headache, nausea, vomiting, pallor, perspiration, chilliness, drowsiness, restlessness, poor pulse."³ We have adopted the use of Pentothal Sodium intravenously to produce anesthesia in patients subjected to encephalography in an attempt to avoid these immediate reactions. Some clinics have used the general anesthetics, ether and ethyl chloride, for the same purpose. Solomon and Epstein⁴ (1932) recommended the use of nonvolatile anesthetics, pentobarbital, Amytal or Avertin, and reported good results with the intravenous injection of 0.3 to 0.5 gm. of pentobarbital-sodium.

In our series of 266 encephalograms from 1935 to 1938 inclusive, Pentothal Sodium (sodium ethyl-methylbutylthiobarbiturate) was used as an intravenous anesthetic in 177 cases and Evipal Soluble (sodium salt of N-methylcyclo-hexenyl-methyl-barbituric acid) in 5. Of the remaining 84

cases, which represent a transition period in 1935 and the early part of 1936, before intravenous anesthesia had been fully accepted as a method of choice, encephalography was done in 28 cases under local infiltration anesthesia, in 11 under Avertin plus local infiltration, in 30 under Avertin, in 6 under Avertin and Vinyl Ether, in 4 under Vinyl Ether and in 5 under open ether. There has been no death in this series.

With Pentothal Sodium intravenous anesthesia, the one-hour to two-hour period of postencephalographic somnolence is very helpful to the patient, as it is during this period that the headaches or dizziness are most severe. On reviewing the records of those patients who had intravenous Pentothal Sodium anesthesia and subarachnoid oxygen insufflation, we found that the average duration of the postencephalographic headache was twenty-four hours. A few of the patients had no headache, while others complained of it for two to three days and, rarely, some had it for five days. Nausea and vomiting when they occurred after encephalography were confined to the first six or eight hours.

DOSAGE

The only reliable guide to dosage is the physiologic response of the individual patient. Our experience has shown that the earlier notion of predetermining dosage from body weight may be dangerous. The very old, debilitated patient requires less, while the young, robust, healthy, muscular individual requires more. Patients who have formerly taken daily doses of the barbiturates, such as luminal, for control of convulsions seem to require more because of a tolerance they have acquired for this group of drugs. The average dose of Pentothal Sodium in our series was

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0.85 gm., and this provided anesthesia for the introduction of air and taking of roentgenograms, which together took thirty or thirty five minutes. The minimum dose was 0.3 gm., and the maximum 2.0 gm.

PREMEDICATION

In most cases atropine sulfate, 1/150 gr., was administered subcutaneously one hour before operation, as this medication decreased the formation of mucus and seemed to decrease the frequency of laryngeal and bronchiolar spasm. A few of the patients received morphine sulfate 1/6 gr., and atropine sulfate, 1/150 gr., subcutaneously and pentobarbital sodium 1 1/2 gr., orally one hour before operation, but there was no apparent advantage from this combination of premedicants.

ADMINISTRATION

Close adherence to a definite precautionary routine before the anesthesia is started will prove valuable. One should test intravenous apparatus to be sure it functions properly, obtain the necessary saline solution from a sterile labeled bottle or flask, have airways within reach of the anesthetist and most important of all, have a gas machine at hand so that in case of emergency oxygen may be administered under pressure.

The patient is seated near one end of the x-ray table with his legs hanging over the side and his head resting on the shoulder of an assistant so that his face is toward the anesthetist as shown in Figure 1.⁵ This is important, as the anesthetist can more readily observe respiration and color, and insert airways or administer oxygen if the patient's face is toward him. Usually the median basilic or the median cephalic vein in the left antecubital space is selected for the site of injection. The solution strength now used is 5 per cent in saline. The 10 per cent solution originally employed was discontinued because it occasionally caused slough or local reaction when accidentally injected into the tissues outside the vein.

The 5 per cent solution is aspirated into a 20-cc. syringe, preferably with an eccentric tip, to which is attached a needle of the anesthetist's preference. One of us (L. F. S.) has employed to advantage a piece of rubber tubing to connect the syringe and needle in giving intravenous agents. The rubber tubing is approximately 30 cm. long of fairly small bore and thick walled with a stopcock and glass adapter at one end for the needle, and at the other end a metal adapter into which the syringe tip fits. The syringe is filled with the

solution, the tubing connected, a needle attached to the glass adapter and the stopcock turned off. After proper preparation of the selected area, the tourniquet is applied to the arm, venepuncture made and the stopcock opened. As soon as the blood appears in the glass adapter the tourniquet is released and the needle strapped into place with adhesive, the syringe may also be strapped to the patient's arm or simply held by the anesthetist. This flexible connection between the syringe and needle has helped to prevent the needle from being pushed through the posterior wall of the

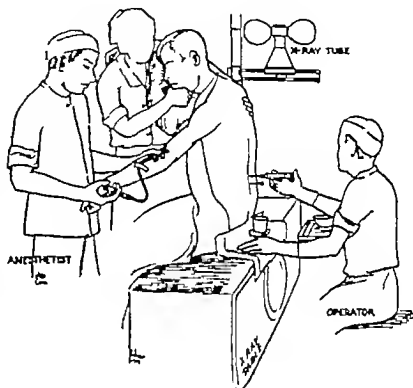


FIGURE 1

vein, as so often occurred with the syringe and needle rigidly connected, when the patient was placed on the table for taking roentgenograms.

Routine use of either a nasal or oral airway is preferred by some, while others use them only when respiratory obstruction is observed. A cotton wisp fastened to the patient's upper lip may be used as an aid in determining the character of respiration⁶ or the anesthetist may listen to the respiratory exchange for any obstruction that may occur.

Injection of the Pentothal Sodium solution is started by the fractional method, and the patient is instructed to count aloud. Initially 3 to 4 cc. is slowly injected in approximately fifteen seconds and after a brief pause to give the solution time to circulate in the blood stream, and permit any individual idiosyncrasy to become manifest before a potentially toxic dose has been administered, another small injection is made. With very young or aged and debilitated patients the initial injection should be smaller in amount and the rate of

administration undertaken slowly and cautiously, always observing the patient's respiration

These small, carefully administered injections are continued until impairment of speech, depressed respirations, loss of conjunctival reflexes and gradual relaxation of the patient mark the onset of anesthesia. Respirations are normal during light anesthesia and become increasingly shallow as anesthesia deepens. While the spinal puncture is being made the patient usually requires an additional small dose of the solution to overcome the painful stimulation.

With the use of the slow, intermittent injections separated by safety pauses, and the maintenance of a clear airway, little difficulty from the anesthetic can be expected. Rarely hiccups will be disturbing, but they can usually be controlled by increasing the depth of anesthesia. On a few occasions patients have shown respiratory depression and anoxemia, which we attribute to overdosage due to too rapid injection. This emergency is handled by oxygen inhalation under pressure or artificial respiration. Respiration can occasionally be started when the patient is still in the sitting position by gentle intermittent pressure over the short ribs.

After the spinal fluid has been replaced by the injected gas the patient is placed in the supine position on the x-ray table and the anteroposterior roentgenograms are taken. Before turning the patient over for the posteroanterior and lateral stereoroentgenograms a final small injection is made, this will generally keep the patient quiet for remaining roentgenograms.

ADVANTAGES, DISADVANTAGES AND CONTRAINDICATIONS

The advantages of intravenous Pentothal Sodium anesthesia are as follows. It provides the neurosurgeon with adequate anesthesia for lumbar puncture, air injection and roentgenography, as the patient is quiet and in good condition throughout the procedure, it overcomes the undesirable reactions formerly seen when encephalography was done under local anesthesia—headaches, nausea, vomiting, pallor, cyanosis, perspiration, chilliness, restlessness and poor pulse, it eliminates the danger of fire or explosion present when inflammable agents such as ether or ethyl chloride are used in the x-ray room⁷, it provides rapid, smooth and pleasant induction for anesthetizing patients in the

sitting position, and it eliminates the possibility of psychic shock.

The disadvantages are these. There may be difficulty in making the injection in certain obese individuals whose veins are small and deeply situated, there is possibility of local reaction if large amounts of the solution are injected in the tissues outside the vein.

Pentothal Sodium anesthesia, given intravenously, is contraindicated in children under seven or eight years of age, since venepuncture is sometimes difficult and maintenance of an even plane of anesthesia is almost impossible, because the patients pass so quickly and unpredictably from one stage of anesthesia to another with the administration of small amounts of the drug, in hepatic insufficiency, jaundice and severe renal disease, as detoxication and urinary elimination are impaired, in patients with increased intracranial pressure with possible medullary compression, because the respiratory center is already embarrassed and the addition of more respiratory depression by Pentothal Sodium may prove fatal, and in patients receiving treatment with sulfanilamide. As the work of Adriani⁸ suggests, this combination of sulfanilamide and barbiturate may be unwise.

SUMMARY

The development of the barbiturates that are both transient and effective in their action has given us a satisfactory intravenous anesthesia for encephalography. A series of cases is briefly presented, giving a method of administering Pentothal Sodium for intravenous anesthesia during encephalography, and the management of complications that may occur. The advantages of this type of anesthesia and its disadvantages and contraindications are also presented.

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NURSING, NURSES AND DOCTORS*

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IN NURSING there are many serious problems of caring for the sick, of education, of administration, of adjustment to a rapidly changing order so perplexing that one must face the question of what it is that changes and what it is, if anything, that does not change. In working out the solution of these problems the spirit of controversy is to be avoided as contributing little illumination and it is necessary to have wisdom, which includes vision and imagination, insight and creative capacity, endurance and patience. This means, when one has a vision of a goal, of one's ideal, that there shall be no undue haste in seeking its realization. Short cuts are sometimes useful but often dangerous, and it is a false doctrine that the goal can be reached without paying attention to the path taken in pursuing it. The way a thing is done will often determine which one of several possible goals is to be attained.

In entering upon a field of controversy, only the scientific spirit can be relied upon as a guide. This means not merely a willingness or even a desire to consider the facts, but a determination to consider all the facts in the case. In one of his essays, William James, with great insight and a keen sense of humor, refers to the "fluidity of the facts," by which he means, as can be judged by what he said elsewhere about stubborn and irreducible facts, that it is opinions about facts that have this fluidity. It is very difficult to look at all the facts at one time, difficult physically and mentally, because really only one thing at a time can be seen. However quickly the eyes are shifted, at the risk of strabismus, attention to one thing means lack of attention to something else which may also be of vital importance. Thus it is very difficult to see things in proper perspective, difficult but necessary.

As one looks over the whole field of the healing art and sees the multitude of efforts that must be put forth by many kinds of persons, by many groups of individuals, two groups stand out as different from all the others because they come into direct contact with the sick, namely the physician, who has the prime responsibility, and the nurse, who has the secondary responsibility.

Here are all the persons directly involved in the care of a case of serious illness: the patient,

the doctor, the nurse. The hospital superintendent administers merely so that the doctor and the nurse can do their work under better conditions, the medical school is for the education of the doctor, the nursing school for the education of the nurse, the laboratory workers, the technicians, the pharmacists, all help the doctor so that he can help the patient. It is this direct care of the patient that marks off the work of the nurse as different from that of all the other assistants to the physician.

Nursing may be regarded from another point of view. What are the things to be done in nursing? Into what parts can the whole field be divided? There are multitudinous needs which do not require enumeration now, but a practical question is: How many kinds of nurses are required to meet these needs? One answer is, as many kinds of nurses as there are needs. These speculations suggest remoteness from the solid earth of actual practice, for one nurse may perform many kinds of service, meeting thereby as many needs, and a pertinent question is: What is this discussion of kinds of nurses about anyhow?

The full answer would take too long a time to be given now, but a partial answer is given by the dollars and cents involved, by practical economics. In general, people are going to buy such nursing service as they think they need. If they need only a little nursing skill and that is available, they will buy it, if they need much and can get it, they will buy that. But if a little will fill their need, they are not going to pay for something they do not need and cannot use.

On the basis of need of the patient, several levels of nursing service are demanded and will be supplied, and if some classification of nurses is thought desirable, there are two groups, the more highly skilled and the less highly skilled. But such distinction is rather arbitrary as a basis for classification and presents no clear-cut differentiation. In the actual practice of nursing, the nurse does what the doctor directs her to do, according to his idea of the skill of the individual, and not according to her classification.

There is a further question as to how much work there is to be done by these two groups respectively, and the kind of work and the conditions under which it is to be done. Broadly speak-

*An address given at the graduating exercises of the School for Attendant Nurses, Household Nursing Association, Boston, November 23, 1919.

ing, the more highly skilled worker is in the general hospital dealing with acute illness, and the less highly skilled worker is out of the general hospital and deals with chronic illness, or acute illness when the convalescence has begun. There are, to be sure, acute cases at home and chronic cases in hospitals, very many of them, but in a general way the distinction which has been made is sound. It is probably true that the field for the less highly skilled worker is larger and the opportunities, in this sense, are greater, but they are less dramatic and less spectacular.

No use here has yet been made of a specific designation for either of the two kinds of workers in order that any possible prejudice from terms already employed might be avoided, for it is basic facts rather than superficial designations that are important. The basic fact is that one group is more highly trained and the other group is less highly trained, and if one is called the nurse and the other the attendant, there can be no serious objection. Both are in substance and in practical activity workers in the field of nursing by direct ministrations to the needs of sick persons; both are actually nurses.

Reference has been made to the problems connected with these two groups of workers as of similar magnitude in the sense of the number of persons needing the service and the number of persons needed to render the service. This introduces another problem, namely, the need, in a field so extensive and so important for the well-being of the public that there should be some control by the state of all persons who offer themselves for this service. Protection is needed against incompetence, whether due to lack of knowledge or lack of skill or lack of moral stamina. Should not every worker in the field of nursing be licensed by the state as qualified to undertake such duties and responsibilities?

An immediate and natural answer to this question is "Yes, of course they should all be licensed. It is terrifying to think of the harm that might be done by incompetent nurses." This answer has been given by some persons who, however sincere and earnest and unselfish, have not, it appears, thought out to all the practical details the implications of what they propose to do. Some of these details will be noted later.

The next very practical question is: How shall each group be prepared for their work, how shall they be trained, or, better, how shall they be educated? The word "education" in this connection needs no justification, for if this ex-

perience in the school of nursing is looked upon as mere training, there is failure to recognize that the candidates are human beings, preparing themselves for what may be their lifework.

It is clear that considerable time and effort have been directed, in the past twenty-five years, to determining how the more highly skilled worker should be educated, and while the system is by no means perfect, a good, workable and fairly adequate scheme has been devised. But it is a matter for surprise and deep concern that so little attention has been given to the education of the less highly skilled worker. This education of the attendant is in the very early stage of an experiment, and while the school which is carried on by the Household Nursing Association represents a fine piece of work, it has not received in Massachusetts or in other states the enthusiastic imitation that the project deserves. It is a fact that while there has been some talk in the past twenty-five years among persons interested in nursing education, there has been very little done for the attendant, and in some quarters there has been of late an unwillingness even to talk about these problems.

It is because there is no generally accepted body of ideas about education of attendants, incarnate in effective institutions, that the highly experimental stage should be continued for some time longer, until there can be crystallized a reasonable procedure, with a sound experimental basis. What is required now is freedom to experiment, and during the period of experimentation, it may be wise for the state to assist by licensing, on the basis of certain qualifications, persons who desire legal recognition. Licensing gives the attendant the recognition and the status that are appropriate, but until this experiment is distinctly farther along in its development, it would be a serious mistake to have compulsory registration of all who render nursing service. Of prime importance in the working out of a problem as complicated as this, and one which has so many aspects which need consideration, is patience. It is folly to secure legislation of which the consequences have not been thought through and realized clearly. Freedom to experiment in educational procedures is necessary for progress, yet it may be lost with the introduction of such compulsory requirements as have appeared in some drafts of proposed legislation.

The argument for compulsory registration is the protection of the public. But if one listens to the accounts of possible suffering from incompe-

tent nursing as set forth by advocates of compulsory registration, and compares those accounts with what one actually finds, one may well be distressed, yet the actuality does not seem to be so bad as it is represented, and nothing is said of incompetence among registered nurses. Why is the situation not so bad as some persons say it should be without compulsory registration? Very briefly, it is because the chief responsibility for the care of the sick is on the physicians, and it is they who have the responsibility for poor nursing and for good nursing. If they insist on good nursing for their patients, they can usually get it. If they are satisfied with poor nursing the patients suffer. Nurses do not realize with sufficient clearness that nursing can never rise above the level of medicine, and that in the medical profession they owe much, but not all, of what they have been able to accomplish.

What is the proper relation of the attendant to the nurse and of the nurse to the attendant? This cannot be gone into in detail, but one of the basic facts is that both justify their existence by the adequacy with which they render nursing service to sick persons. Both are rendering necessary services for which there will be a permanent need in society. In the final analysis, the relations will be determined by the reciprocal respect, on the part of each group for what the other group is doing.

There is another problem which involves basic issues. If it is not solved properly the system that it supports breaks down. What is the relation of the nurse to the doctor? Some of the things that the nurse may do are part of the practice of medicine. This is true whether she is or is not registered. But she is permitted to do them because she is caring for the sick under the direction and supervision of the physician. If she gives nursing care to a sick person, not in emergency and not under the implicit or explicit direction of a physician she is acting improperly. Now, the basic relation between doctor and nurse has unavoidable implications which some persons are not willing to acknowledge. The implications are not only a responsibility of the physician for what the nurse does in practice, to which reference has been made, but also a responsibility for participating in

the education of the nurse and a responsibility for participating in the determination of her qualifications for the practice of nursing. It is true that some physicians are not willing to accept these offices, but that does not lessen the duty of the medical profession. Neither does it justify the claim that nurses alone should control the education of nurses, or that nurses alone should carry the responsibility for determining the qualifications of the nurse, who is to work only under the direction of the physician. In the field of the healing art, the nurse, whether registered or unregistered, is a subsidiary worker, and it is not likely that this relation will change in this generation. It is the part of wisdom to recognize this fact, and to make plans accordingly.

The final question concerns the status of nursing. Is it a profession? What is a profession? It was formerly easy to answer this question: there were three professions, theology, law and medicine. Now there are many others, and what a change has taken place in medicine itself! It was at one time deemed beneath the dignity of the physician to work with his hands, so the hand worker or surgeon, from which comes the word surgeon, was a barber-surgeon. In the Oath of Hippocrates are these words: "I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work." Just as medicine has grown to include surgery and has raised it to a professional level, so many callings once thought lowly have taken on a professional tinge. Even business, which had its origin in barter, a word which has apparently the same origin as barratry, a form of cheating, some would raise to the professional level.

The essential distinction of the profession is the spirit in which the worker does his work. The work of the nurse is, in part at least, ministering directly to the needs of sick and suffering human beings, and if they believe in the dignity and worth of humanity even if they do not see very clearly what it is that gives that worth, and if, working for the benefit of their patients, they respect the patients and themselves, they will be able to live their own lives in the spirit of a profession.

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REPORT ON MEDICAL PROGRESS

HEMATOLOGY*

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DURING the year 1939, most of the hematological advance centered on physiological rather than morphological principles. Whereas until recent years there was danger that preoccupation with morphology might result in a "dead" subject, there has recently been evidenced, at least in some quarters, a complete turnabout from morphology. The latter nevertheless has its place and its study need not be neglected, even though "dynamic" hematology has proved its pre-eminence.

During 1939, much was learned about hematological methods in diagnosis, motion-picture differentiation of the lymphoblast from the myeloblast, hematologic reactions to drugs, the experimental production of pernicious-anemia-like disease in animals, the gastric mucosa in pernicious anemia, the various events in iron metabolism, the pathogenesis of the hemolytic anemias, the treatment of polycythemia, and vitamin K and prothrombin.

BONE-MARROW BIOPSY

Although a number of observers regard biopsy of marrow by sternal puncture as practically a routine measure in the careful study of a hematologic case, there are others who maintain either that the procedure has no value or that its value is limited. As with many of the diagnostic developments in medicine, it is likely that widespread knowledge of the need for sternal puncture will become manifest only with the passing of time. One is thoroughly accustomed nowadays in the working out of a hematological problem to do a "complete" blood, whereas not so many years ago only a hemoglobin determination was thought essential. The hematocrit reading and the various indices, such as the mean corpuscular volume and the mean cell diameter, have all come to the forefront in recent years, and have proved of great value chiefly in appreciation of the pathologic physiology of a given hematological problem. Biopsy of the marrow by means of the sternal

puncture is only slightly more difficult than venepuncture, and it gives much information regarding abnormal physiology. Regardless of possible diagnostic aid, its educational value alone in making the physician think in terms of bone marrow disease is great. Too often, the blood is considered as a fixed sort of fluid containing certain types of cells. In reality, it is simply a circulating "road way" with cells coming from the blood-forming organs on their way to certain tissues. At a given moment, the circulating blood may improperly reflect conditions in the marrow, the chief blood-forming organ, for a number of different conditions may present an identical blood picture. This is particularly true when pancytopenia is present—that is, a reduction in all the cells of the blood. Pancytopenia may be due to aplasia of the marrow, leukemic hyperplasia, Gaucher's disease, metastatic cancer, particularly of the sarcoma variety, severe infectious states, "spleen-liver" syndromes and certain deficiency states. Many of the diagnostic puzzles in hematology present pancytopenia, the remainder of the cases have, without too much attention to diagnosis, responded to the administration of liver extract, iron or both. It is therefore in the cases with anemia, leukopenia and thrombocytopenia that the sternal puncture is clearly indicated and is often of considerable diagnostic aid.

The technic of sternal puncture is simple, requiring novocainization of a small area in the midsternum in the region of the fourth interspace, and the insertion of an abbreviated lumbar puncture needle or a special sternal puncture needle† until a sensation of "give" is felt. In elderly people, the needle is readily inserted through the bony structure of the anterior lamella, in the young and middle-aged a certain amount of controlled pressure is required. Vogel and Bassett¹ recommend a 12-mm 18-gauge needle for children over one year of age and a 6-mm 20-gauge needle for infants under one year. They use no anesthesia. A small amount of marrow, never more than 1 cc, is aspirated with a 5-cc or 10-cc dry syringe. Inspection of the material in gross

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‡The author uses the Becton-Dickinson sternal puncture needle.

as it is aspirated and placed on slides often gives some idea as to the degree of hyperplasia, hypoplasia or leukemic infiltration. Smears are made on slides and stained either with Wright's stain or with Giemsa's. With this method beautiful preparations usually are obtained, by means of which careful studies of the various types of nucleated red cells, white cells and megakaryocytes may be made. Sections may also be prepared by collecting some of the marrow material on filter paper, placing it in Zenker or Zenker formol fixative and later staining it with eosin and methylene blue. Careful and long-continued practice with bone marrow preparations should familiarize the observer with the various normal and abnormal cells and their relations to each other. The trephine method of biopsy which I formerly advocated is now used only if the puncture preparations are inadequate, or if definite confirmation is required regarding such abnormalities as Gaucher's disease, lymphoma, leukemic proliferation aplasia of the marrow or osteosclerosis. In these conditions, the sternal puncture alone may be misleading or offer no diagnostic aid. An excellent and critical review of the subject of bone marrow biopsy is that of Scott.²

RED BLOOD CELLS

Paternity Tests

The use of blood groups in bastardy cases when the question of paternity is involved is receiving increasing attention. In the states of New York, New Jersey and Wisconsin the use of blood group tests in these cases is mandatory, if an individual refuses, he may be suspected of fraud. The tests can be used only to exclude paternity. By using the four ordinary blood groups (O, A, B and AB) paternity can be excluded in only about one sixth of the cases tested when child, mother and putative father are examined. By utilizing anti M and anti N testing serums (Landsteiner Levine), it is possible to divide all individuals into M, N or MN groups. The use of both the ordinary blood groups and of the M and N factors leads to the exclusion of paternity in 33 to 40 per cent of the cases tested. Provided the serums are correctly prepared and the testing properly done and carefully checked, the results obtained are of definite and absolute value. The subject of blood grouping in the establishment of nonpaternity and in baby mixups has been covered by Wiener,³ Levine⁴ and Davidsohn and Rosenfeld.⁵

The Sedimentation Rate

In tubes in which blood has been prevented from clotting by an anticoagulant, the red cells sediment at a rate dependent to a great extent on certain changes in the serum. Some serums, notably those from patients with infectious diseases or any condition in which there is increased breakdown of tissue, have increased rates, that is, they have the property of causing red cells to sink rapidly. This very rapid settling is due to the formation of large aggregations of rouleaux. When rouleaux formation is for some reason impaired, as in sickle-cell anemia (Bunting⁶), the sedimentation rate is considerably slowed. Cutler, Park and Herr⁷ point out that the effect of serum changes on the sedimentation rate is more important than that of anemia. These authors question the necessity of correcting for anemia. According to Ham and Curtis,⁸ who have made a comprehensive review of the entire problem, the Rourke and Ernestine method is the most accurate. With this method, heparin is used as an anticoagulant, the rate of sedimentation is observed at five minute intervals to obtain the second or true sedimentation phase and a correction for anemia by means of the hematocrit is made. Hambleton and Christianson,⁹ on the other hand, state

Alleged improvements upon the Westergren sedimentation method have been presented which appear theoretically correct, e.g. correction for cell volume, the use of heparin in place of citrate and graphic methods of recording the results. Instead of making the test more valuable, these changes have the reverse effect, either by leading to results of less clinical value, or by making the test more tedious to perform or less clear to interpret without increasing its clinical value. Hence it is recommended that the Westergren method, by reason of its simplicity, reliability and priority, should be adopted as the standard method of performing the sedimentation test.

The sedimentation rate is so nonspecific that one questions the desirability of attempting too great accuracy with the procedure. Furthermore, it is important to realize that the test is by no means infallible; abnormal rates may be obtained in normal individuals, especially in the older age groups, and normal rates are often present even when serious organic disease, such as cancer, is present. The sedimentation rate should be regarded as a single laboratory procedure which, with all the rest of the data, may be of some significance in helping to evaluate a given problem. In the follow-up of such conditions as rheumatic fever, rheumatic heart disease, rheumatoid arthritis and coronary thrombosis the test is apparently

of definite value. As with many other laboratory procedures, its value depends to the greatest extent on the observer's critical judgment

Stiles¹⁰ conducted an interesting comparative study of the value of blood smears and sedimentation rates in "low-grade chronic illness," such as nasal congestion, postnasal discharge, chronic bronchitis, colitis, prostatitis and rheumatic pains. The immature polymorphonuclear cells ("non-filament cells") were increased in practically all these cases and their number returned to normal as the condition improved. More than 80 per cent of the sedimentation rates were abnormal. The blood smear, although a more sensitive indicator of the presence of disease, was found less significant because of this sensitivity. In infectious mononucleosis, even with marked disease present, the sedimentation rate is usually normal.

Stippling of the Red Cells

The clinical significance of punctate basophilia or stippling was studied by Falconer.¹¹ The Jenner-Giemsa stain was used and five thousand erythrocytes were studied in each case. In normal individuals, the "mean punctate basophilia" was 92 per million red cells. In various types of anemia not due to lead, the counts varied from 2000 to 27,000. In 8 workers exposed to lead but free of symptoms, the average stippled count was 2100 per million red cells. Thus stippling, although common in lead poisoning and often diagnostic, is not pathognomonic of the condition, but may occur in various states, particularly when associated with anemia. Absolute diagnoses in questionable cases are made by urinary-excretion studies, spectrographic determinations of the blood and urine and so forth.

Indices

The various devices for estimating the dimensions of the normal and abnormal red cell are by now well known, and are coming into increasingly common usage. These have been popularized by Wintrobe and include mean cell diameter, mean cell volume, mean cell thickness, mean corpuscular hemoglobin concentration and so forth. Of these, the mean corpuscular volume has come into the widest use, superseding to a great extent the more laborious methods of Price-Jones for differentiation of normocytic, macrocytic and microcytic anemias. There is at times, however, an unfortunate tendency to diagnose macrocytic anemia when the mean corpuscular volume is only slightly elevated above the normal range of 84 to 94 cubic microns. In severe anemia, when slight fluctuations in hematocrits and erythrocyte

counts may result in marked changes in the estimated mean cell volume,* a normocytic type of anemia may, because of slight technical differences, be considered macrocytic, that is above 94 cubic microns. Study of the mean cell volume alone, without reference to the mean cell diameter, will occasionally lead to error, especially in the hemolytic anemias. Here it is occasionally of some importance to know whether there is a true macrocytic type of anemia or one in which the red cell diameter is normal but the mean cell volume is greater than normal. A "pseudomacrocytosis" may be associated with a normal red-cell diameter (normocytosis) and an increase in red-cell thickness. This is probably the situation in most of the cases of so-called macrocytic hemolytic anemia.¹²

Kato¹³ has created an ingenious triaxial chart which correlates the color index, volume index and saturation index. By use of this chart, Kato states, it is possible to make "an accurate hematologic classification of all types of anemia, so essential a foundation for rational therapy." The chief value of the various indices, aside from the intellectual diversion they might give, rests in the value they may have in the treatment of anemia. For use in infants and young children, Kato¹⁴ has devised a "combination microhemopipette" which is useful in determination of the hemoglobin, hematocrit reading, sedimentation rate, fragility test and prothrombin time.

WHITE BLOOD CELLS

The function of the *lymphocyte* has for many years eluded numerous investigators. By motion picture studies of supravital preparations of cells which had been grown in tissue cultures, Rich, Lewis and Wintrobe¹⁵ effectively showed that the large cell of acute splenic tumor and of the regional lymphadenopathy of acute infections was an early or large lymphocyte. Enlargement of the spleen or lymph nodes was frequently found to be nonspecific and noninfectious (allergic states, serum sickness). It was suggested that lymphocytes might have something to do with the formation of antibodies to foreign protein. In another study of leukemic blood cells from tissue culture preparations the same workers¹⁶ demonstrated conclusively the very marked physiologic differences between the myeloblast, the lymphoblast and the monocyte-histiocyte. They pointed out the lack of definite information which ordinary supravital preparations may give regarding cellular motility, and the very striking cytologic differences

*With a red-cell count of 1 500 000 and a hematocrit reading of 16, the mean corpuscular volume is 106 cubic microns (macrocytic). Another count just as accurate may show a red-cell count of 1 700 000 and a hematocrit reading of 15, the mean corpuscular volume being 90 cubic microns (normocytic).

seen with the combination of the tissue-culture technic and slow motion cinematography

The cells of *infectious mononucleosis* have been shown by numerous investigations to be abnormal lymphocytes. The word mononucleosis is a relic of the days when lymphocytes and monocytes were indiscriminately grouped together as mononuclear cells. The name of the condition might well be changed to infectious lymphocytosis or benign infectious lymphadenosis. Be that as it may the condition is a very common one and still goes unrecognized in many cases. It is very likely, as stated by Foord and Butt,¹⁷ that only a small proportion of the actual number of cases that occur are properly diagnosed. From the standpoint of differential diagnosis in conditions associated with continued fever, chills and fever, headache with cerebral symptoms, jaundice, abdominal pain (particularly in children), severe sore throat and so forth, the practitioner should be constantly on the alert for the disease. This is particularly true if a college student, a medical student or a nurse contracts some sort of febrile illness. Generalized lymphadenopathy is not always present in some cases there is only localized adenopathy or splenomegaly. The white-cell count may be low normal or high. Owing to enlarged mesenteric lymph nodes, abdominal pain may be present this symptom, associated with a high leukocyte count, may tempt the surgeon to perform an appendectomy. With a low leukocyte count, the possibility of agranulocytosis may be considered. A positive diagnosis can be made in the great majority of cases by careful examination of the stained blood smear, which shows a bizarre type of lymphocytosis with all sorts of queer staining and unusually shaped lymphocytes. The platelets are abundant, and there is no anemia, both of which are important differential points with respect to leukemia. The serum test (heterophil agglutination test) has proved to be very valuable in confirmation of the diagnosis. Positive tests are usually found as early as the fifth day, although the titer may continue to increase during the first ten or fourteen days. The positivity of the test remains, according to Davidsohn¹⁸ who has done some of the outstanding work with the test, for an average of one hundred and nineteen days. Clinical recovery is rapid—a matter usually of two to four weeks, complete hematological recovery occurs in sixty to ninety days, or even longer in some cases, complete serological recovery is generally slowest. In a certain number of the cases (up to 18 per cent according to A. Bernstein¹⁹) the serological tests for syphilis may be positive, becoming negative as the condition improves.

HEMATOLOGIC REACTIONS TO DRUGS

The startling therapeutic effects of sulfanilamide and sulapyridine have at the same time been associated with an increase in the incidence of hematologic reactions. The bone marrow appears to be especially vulnerable to chemicals containing the benzene ring. This vulnerability may manifest itself in the blood as a total effect, with resultant anemia, leukopenia or thrombocytopenia, or in a more selective fashion. Most of the recent investigations have demonstrated that the cyanosis of sulfanilamide administration is due to the development of methemoglobin or sulf hemoglobin. In the work of Harris and Michel,²⁰ it was found that the degree of methemoglobinemia correlated in general with the blood sulfanilamide concentration, although other individual factors were undoubtedly important. It was shown by Harris²¹ that sulfanilamide in the presence of both hemoglobin and animal tissue resulted in methemoglobin formation in vitro. Sulfanilamide incubated with hemoglobin alone failed to cause methemoglobin production. As a rule, one is not concerned with the degree of cyanosis, if this is excessive, however, Campbell and Morgan²² recommend the administration of methylene blue intramuscularly (400 mg.), intravenously (150 mg.) or by mouth (1 gm.).

Agranulocytosis probably represents, at least in many cases, a sensitization phenomenon on the part of the bone marrow leukocytes to a chemical which may have become linked to serum protein. Thus far, a test for the susceptibility of a given individual to the sulfanilamide group of drugs has not been developed. The severest reactions probably occur when the drug is given intermittently, although it is possible, as pointed out by Butt, Hoffman and Soll²³ in their animal experiments with amadopyrine, that large doses given over a long period of time may cause toxic hypoplasia of the marrow with resultant granulocytopenia. Jackson and Tigbe²⁴ analyzed 239 cases of agranulocytosis reported since 1933. In 75 untreated cases the mortality rate was 78 per cent, whereas in 85 cases treated with pentose nucleotides the mortality rate was 35 per cent. The recommendation is made that at least 40 cc. of the latter material be given daily. In the experience of many hematologists scattered throughout the country and personally interviewed, the results with this drug—and with all other measures—in cases of agranulocytosis due to sulfanilamide or one of its derivatives have been disappointing. It would seem that there is no one specific of value in treatment if the bone marrow leukocytes

are not irretrievably damaged, the patient will recover, otherwise the effects of therapy in a given case are very dubious

Leukemoid reactions following sulfanilamide are occasionally seen, and recently an interesting case was observed in which there was first a leukemoid reaction (high white-cell count, myelocytes) followed by a granulocytopenic reaction. At times, one suspects the possibility that acute leukemia itself might have been initiated by the drug. The cases in which acute leukemia follows sulfanilamide administration do not in all probability indicate more than a coincidental relation, although at times a possible causal relation must be suspected. Thrombocytopenic purpura and complete aplastic anemia are rare with sulfanilamide. About fifty cases of the former condition have, however, been reported following the use of the sedative Sedor-mid.

PERNICIOUS ANEMIA

Wintrobe, Samter and Lisco²⁵ have produced a close analogue of pernicious anemia in young suckling pigs by the use of a diet deficient in the various factors of the B₂ complex. The feeding of yeast was sufficient to prevent the anemia, but in the absence of this substance a macrocytic anemia hematologically comparable to that seen in pernicious anemia was observed, together with neurologic lesions and a hyperplastic bone marrow. No response occurred when nicotinic acid, riboflavin or vitamin B₁ was administered, but reticulocytosis and marked improvement in the anemia occurred when yeast was given. These experiments are confirmatory of the well-known theory that pernicious anemia is a deficiency disease, perhaps concerned with a long-standing dietary deficiency, either as such or conditioned by an abnormality of the gastrointestinal tract. Alsted²⁶ reports a clinical case of "exogenous pernicious anemia" which developed as the result of a totally inadequate diet, although the gastric juice contained free hydrochloric acid, an excellent therapeutic result was obtained without the use of liver extract. Whatever the cause, deficiency in the liver-extract principle results in a peculiar hyperplastic state in the bone marrow. This is characterized by an increase in primitive erythroblasts (erythrogones) and the presence of characteristic megaloblasts and of abnormally shaped metamyelocytes. Israels²⁷ confirms the work of Dameshek and Valentune²⁸ on these points.

The appearance of the gastric mucosa in life was studied by Schindler and Serby²⁹ in 23 patients. All the untreated cases presented superficial gastritis, atrophic gastritis or patchy atrophy.

In 12 cases the condition of the gastric mucosa after treatment was greatly improved. From these observations, it was postulated that two separate disorders might be present in pernicious anemia: a primary disorder of the cells producing the anti-anemic factor, and a gastritis which might or might not heal when the deficiency state is eliminated. The condition of the tongue and that of the gastric mucosa are frequently related. That pernicious anemia is also a hemolytic anemia has recently been stressed by Rhoads and Miller.³⁰ To explain this on a deficiency basis is difficult, unless one postulates, as Rhoads has done, that in the presence of a deficiency state certain toxic processes might become unusually active in hemolysis. In the therapy of the disease, Meulengracht³¹ found that parenteral therapy was too expensive for most Scandinavians and of no greater potency than Pylorin, which is derived from the mucosa in the region of the pylorus. This material, apparently twice as potent, gram for gram, as Ventriculin, was effective in maintaining a normal blood picture and in preventing neurologic involvement. In this country it is possible that we are too free in the use of parenteral therapy and that a certain number of patients would probably do very well on oral therapy alone. At times, this method of administration becomes necessary when the patient develops severe reactions to injected liver extract. If this should eventuate, three courses are open to change from the ordinary swine-liver extract to beef-liver extract*, to desensitize the patient by giving gradually increasing doses, and to give liver, liver extract or gastric extract by mouth. In the presence of neurologic lesions, parenteral therapy must of necessity be continued. It should be noted that even at a normal red-cell level, neurologic lesions may still be present. These may well respond to intensive parenteral therapy. This is particularly true of lesions in the posterior columns. In my hands, highly concentrated and refined liver extracts, which the patients like because of their small bulk, are highly effective, perhaps even more so than are the more dilute, cruder types. This indicates that what the patient with neurologic involvement needs is plenty of liver-extract principle and that other factors, including the vitamin B complex present in the dilute liver extracts, are not ordinarily essential.

IRON DEFICIENCY ANEMIA

A number of investigators have recently pursued various aspects of the problem of iron metab-

*Campolon Liver Extract (Winthrop) or Lederle Beef Liver Extract (obtainable on request) may be used.

olism. Josephs³² found that during the first months of life there was a tendency to a negative iron balance (loss of iron from the body), a positive iron balance was later established. Whereas normally about 60 per cent of the ingested iron was absorbed, a slightly diminished retention of iron was present during infections and in vitamin D deficiency. In anemia, the organic iron of the tissues appeared to be retained, at times it became unavailable for use by the marrow. Inorganic medicinal iron was, however, readily available. An interesting study with "marked" or radioactive iron was made by Hahn, Bale, Lawrence and Whipple³³ in anemic dogs. In the normal dog, iron was absorbed in only negligible amounts, but in the anemic animal it was promptly assimilated, absorption taking place through the mucosa of the small intestine, whence the iron is transported in the plasma. Within a few hours, in the anemic dog, some of the absorbed iron was found in the red cells of the blood. The reticuloendothelial cells of the spleen and marrow took up large quantities of iron, in this manner acting as a reserve store of readily available and utilizable iron. Moore, Minnich and Welch³⁴ present a very interesting group of observations dealing with changes in the serum iron and in the "easily split-off" blood iron. Serial observations during iron therapy gave a dynamic picture of the rapidity of transportation and absorption of ingested iron. The serum-iron absorption curves were higher following ingestion of ferrous than of ferric salts, this was particularly true of the water soluble, highly ionized ferrous salts. Differences in gastric acidity exerted no measurable effect on serum iron absorption curves when inorganic iron was given. Ingested iron is probably acted on by the free hydrochloric acid of the gastric juice, which may dissolve and ionize it. In the duodenum, the ionized iron is probably reduced from the ferric to the ferrous form. Absorption then takes place as ferrous iron, largely in the upper part of the small intestine.

Kennedy³⁵ conducted a study on the incidence of anemia in women of the low income class in Montreal. He found that menstrual loss was of definite importance in the development of anemia, and that the low iron content of the diet necessitated by poverty was often insufficient to keep pace with the demands of menstruation and repeated pregnancies. Bethell, Gardiner and MacKinnon³⁶ studied the influence of iron and the diet on the blood in pregnancy. The basic diet recommended for pregnancy, as formulated by the League of Nations Technical Commission

provides a daily protein intake of approximately 80 gm., including meat, eggs and adequate quantities of vitamins A, B (complex), C and D. Anemic women receiving iron (ferrous sulfate, 15 gr daily) showed much higher hemoglobin and red-cell values than did those not receiving this medication. Patients without anemia did about the same whether or not iron was given.

The chronic primary or idiopathic hypochromic anemia, which is an iron-deficiency state occurring usually in adult women, is for the most part associated with menorrhagia, multiple pregnancies and inadequate iron intake, plus the added and very important factor of an impaired gastric mucosa, as shown by achlorhydria and directly by visual inspection with the gastroscope. Occasional cases of this sort are seen in men but they are extremely rare, and the question of past or occult bleeding from the gastrointestinal tract should be thoroughly investigated. The response to inorganic ferrous iron (ferrous sulfate, 15 gr daily) in these cases is dramatic.

HEMOLYTIC ANEMIAS

Although the diagnosis of acquired hemolytic jaundice or anemia has for some reason gone out of fashion in recent years, there are indications that it might well be revived. A tentative classification of the hemolytic anemias is as follows:

Congenital

Acute ("hemolytic crisis")

Chronic

Acquired

Known cause

Infections (Welch bacillus, malaria and so forth)
chemicals (sulfanilamide and so forth)

Symptomatic (carcinomatosis, Hodgkin's disease, lymphosarcoma, leukemia and so forth)

Idiopathic (with or without hemolysins or auto-agglutinins in the blood serum)

Acute

Subacute

Chronic

Barker³⁷ and Vaughan and Saifi³⁸ emphasize the importance of determinations of the daily fecal urobilinogen output as a measure of the degree of hemoglobin destruction. In hemolytic anemias, including pernicious anemia, the urobilinogen output is greatly increased. The latter is a far more sensitive test than the urinary urobilinogen output, at least as measured by the ordinarily used Wallace-Diamond technic.

An excellent discussion of the spherocyte and its relation to hemolytic anemia is presented by Haden³⁹, the relatively thick spherocyte which is seen in various hemolytic syndromes cannot take

up very much water when placed in hypotonic solutions of sodium chloride, and therefore bursts (complete hemolysis) long before the more normal biconcave disk. Conversely, a very flat cell is more resistant because it can imbibe a large quantity of water before bursting. Heilmeyer⁴⁰ and Schwartz and I¹² disagree with the current conception that the bone marrow is at fault in congenital hemolytic jaundice and produces thick cells or spherocytes. Heilmeyer believes that the spleen is responsible for the spherocytosis. Dameshek and Schwartz have demonstrated that anemia with spherocytosis may be experimentally produced by hemolysins, on this and other grounds, they have evolved the conception that hemolytic anemia of various types may be due to hemolysins of different types acting in various "dosages." Spherocytosis and increased saline fragility may thus be taken simply as indicative of the presence of a hemolytic process. The spherocyte is the forerunner of hemolysis. Because spherocytes are rounder than normal, they have difficulty in piling up in rouleaux in fresh preparations. Examination of fresh preparations of blood may thus be diagnostic of hemolytic anemia, as pointed out by Dameshek.⁴¹ The abnormal rouleaux are short and form very poor aggregates, thus in hemolytic anemias the sedimentation rate is apt to be slow. Vaughan⁴² noted that following splenectomy in congenital hemolytic jaundice the red cells often became normal in size, although they still retained an abnormal fragility. The loss in spherocytosis indicated to Vaughan that the spleen has some effect in altering the shape of the red cell, the persistence of increased fragility might indicate, however, a fault in red-cell formation. She suggests, therefore, that in congenital hemolytic jaundice there may be disturbances in both splenic and bone-marrow function. According to Berghem and Fahraeus,⁴³ the spleen is the "incubator of the body," and within its relatively static confines, the blood cells are acted on by a substance normally present in plasma, namely "lysolecithin." This substance, which may be responsible for normal red-cell destruction, is said to have the capacity to change biconcave red cells to spherocytes and thus to inhibit the sedimentation rate. Singer⁴⁴ has developed a micromethod for testing this normal lysis in the blood, he found no increase in lysolecithin in the blood of cases of hemolytic anemia. Because the spherocytes of congenital hemolytic jaundice can be hemolyzed by lysolecithin in high dilution, whereas spherocytes from other conditions behave like normal erythrocytes, Singer postulates that spherocytes, although morphologically

identical, may be physiologically different. This has been the point of departure for the concept of differential fragility, as proposed by Dameshek, Schwartz and Singer.⁴⁵ By testing the same red cell against different types of lysins, it is possible that different types of spherocytes may be discriminated and that, in this way, clues may be obtained as to the cause of the spherocytosis.

For some reason the diagnosis of acquired hemolytic icterus or anemia has been avoided in recent literature, and has been to a great extent superseded by such terms as Lederer's anemia and macrocytic hemolytic anemia. The eponymic term Lederer's anemia is probably not justified, because the condition was described in case reports by various European writers for many years before Lederer's descriptions in 1925 and 1930. The term macrocytic as applied to these cases is also probably not entirely justified, because the mature red cells in this condition are not macrocytic but either normal in size or microcytic. The macrocytosis is usually more apparent than real, being due to the large number of immature polychromatophilic reticulocytes, which are larger than the normal mature red cells, as well as to increased thickness of the erythrocytes. Watson⁴⁶ uses the term macrocytic hemolytic anemia as synonymous with acquired hemolytic jaundice. In most of his cases there was true macrocytosis, but this was probably due to the fact that cirrhosis of the liver, Hodgkin's disease or leukemia was present. Autoagglutination of the red cells, as occurring in acquired hemolytic jaundice, was stressed by Widal and his collaborators between 1907 and 1914. It has recently been rediscovered and has been reported in a number of cases of acute and macrocytic hemolytic anemia. Antopol, Applebaum and Goldman⁴⁷ report this phenomenon, which may make blood grouping tests difficult, in 2 cases of acute hemolytic anemia following the administration of sulfanilamide.

One of the most dramatic events in medical practice is the effect of splenectomy in a patient seriously ill with the hemolytic crisis of congenital hemolytic icterus or with acute (acquired) hemolytic anemia. Within a few hours after operation, there is usually a remarkable improvement both in the appearance of the patient and in his sense of well-being. Before the operation of splenectomy is decided on, the effect of one to three transfusions of carefully matched citrated blood of the same blood group given slowly may be tried—"bank" blood should not be used. If evidence of hemolysis continues, splenectomy should be performed without further delay. The giving of too

many transfusions may result not only in severe reactions but in overburdening the circulation, too much delay may result in a fatal outcome. The acute hemolytic crisis, whether congenital or acquired, requires careful and intelligent handling, and represents as much of an emergency as a case of diabetic coma.

Of 15 cases recently observed by me, 8 patients made dramatic and sustained recoveries, 5 died shortly after operation, and 2 relapsed. Of the latter, one has died and the other has improved after a second operation in which a dermoid cyst was removed. Andrus and Holman⁴⁸ recommend the injection of 1 cc. of adrenalin just before delivering the spleen. The resultant splenic contraction is said to facilitate the delivery of the organ into the wound, and also expresses some of the excess splenic blood into the general circulation. They report seventeen splenectomies in hemolytic jaundice without an operative death. Thompson⁴⁹ discusses typical and atypical hemolytic anemias and the end results of splenectomy. The results were uniformly good (except in 1 case) in the typical group, but were poor in the atypical group, including cases of acquired hemolytic jaundice.

ATYPICAL HEMOLYTIC ANEMIAS

Sickle-Cell Anemia

Diggs and Bibb⁵⁰ describe the red-cell characteristics in sickle-cell anemia. The percentage of typically sickled cells is not related to the severity of the anemia. 'Mexican hat cells' (Haden and Evans⁵¹) or "target cells" (Barrett⁵²) are common. These cells are shaped like a bull's-eye or target in stained preparations, and are more resistant to hypotonic solutions of salt than are the normal erythrocytes. Arena⁵³ reports 5 cases in children, notable because of the appearance of serious cerebral vascular disturbances. Capillary stasis due to distortion and agglutination of red cells, together with other factors such as fever and infections, probably contribute to the development of arterial thromboses.

Erythroblastic Anemia

Atkinson⁵⁴ points out the various clinical features of Cooley's anemia, usually a disease of young children and ordinarily fatal before puberty. The 2 cases described have been followed for thirteen years. The girl, aged twenty, began to menstruate at sixteen and is asymptomatic; no nucleated red cells have recently been seen. This is apparently a very mild case, which may be more or less "burnt out." The patient's brother, aged seventeen, has had a much more stormy course, perhaps because splenectomy was done at the age

of six. Showers of nucleated red cells have persisted without much change over the years. The treatment has consisted of iron in large doses. The author quotes Caminopetros,⁵⁵ who found that certain relatives of individuals with the disease showed an increased resistance of the red cells to hypotonic solutions of salt; these individuals, Atkinson believed, might be the carriers of the disease. The red cells of Cooley's anemia, unlike those of congenital hemolytic jaundice and like those of sickle-cell anemia, show a decreased fragility.

POLYCYTHEMIA

Rosenthal and Bassen⁵⁶ present an interesting study on the course of polycythemia based on an analysis of 13 cases. The disease may be asymptomatic and discovered accidentally. It may be of many years duration. Extremely high platelet counts were present in about 30 per cent of 75 cases; in these thromboses were common. These authors lay much stress on the evidences of leukoblastic activity and on the possibility that leukemia will eventually develop in many cases. "Spent" polycythemia may be associated with a chlorotic (low hemoglobin) tendency, high platelet or leukocyte counts, or osteosclerosis. Possibly belonging to the latter group of cases are the 2 cases of "leuko-erythroblastic anemia" and myelosclerosis reported by Vaughan and Harrison.⁵⁷ Both their patients had initial polycythemia, but when studied several years later they showed marked splenomegaly, irregular density of the spongiosa of the bones, anemia with leukocytosis, thrombocytosis and nucleated red blood cells, increased saline fragility and fibrosis of the marrow. Miller⁵⁸ reports on the high incidence of coronary artery thrombosis in polycythemia vera as based on 7 cases which came to postmortem examination of these 3 showed the evidences of coronary artery occlusion.

Haden⁵⁹ discusses the red-cell mass in polycythemia with relation to diagnosis and treatment. The red-cell mass is determined from knowledge of the volume per cent of packed red cells (hematocrit reading) and the total blood volume. The red-cell count does not accurately measure the total increase in the mass of red cells within the body since the red cells are apt to be small and hypochromic, whereas the red-cell mass per kilogram is the most sensitive indicator. Haden believes that the treatment of polycythemia should be based on the total red-cell mass. Dameshek, Henstell and Schwartz⁶⁰ have come to similar conclusions, except that they believe that in practice the use of the hematocrit reading for an indication of the total red-cell mass is justifiable. Therapy should be directed to lowering the hematocrit

reading and maintaining it at a normal level (approximately 46 per cent) After the establishment of an iron-deficiency state by repeated venesections (usually two per week for three or four weeks) of 500 cc, continuation of the iron-deficiency state may be maintained by a diet low in iron The red-cell count may rise in three or four months, but so long as the hematocrit reading remains at an essentially normal value, no further treatment is necessary Ordinarily, cases will go along for eight to fifteen months between series of venesections

The use of a low-iron or low-protein diet alone has not been found effective in our cases, but Herzog and Kleiner⁶¹ report striking results in 19 cases with a diet extremely low in animal protein Andersen, Geill and Samuelsen⁶² treated a case of polycythemia with x-rays over the Brunner-gland region of the stomach and duodenum, with an excellent result Their purpose was to diminish secretion in the area in which the intrinsic factor is formed The authors believe that this method is more rational than that of treating the bone marrow with x-rays My experience with x-ray therapy in this disease has been disappointing, furthermore, it seems unwise to expose an individual with essentially normal tissues to x-ray therapy, which might at some future time result in neoplastic proliferation

HEMORRHAGIC STATES

Blood Clotting

Seegers and his co-workers⁶³ at the University of Iowa describe further work in the purification of thrombin The addition of calcium and thromboplastin to a prothrombin solution resulted in a crude thrombin which could be further purified One cubic centimeter of a 1 per cent solution of this purified thrombin was effective in clotting 1 cc of blood in two seconds By the use of a thrombin solution spray, these workers were able to stop the oozing from incised liver, bone and brain tissue Its application to clinical hemorrhagic conditions has thus far been slight, but the further results of these investigators will be well worth watching

The clotting of blood is taken up from another direction by Ferguson and Erickson,⁶⁴ who have studied the action of trypsin This enzyme can clot citrated plasma without added calcium or cephalin Trypsin may be one of a series of thromboplastic enzymes which cause the mobilization of calcium and thromboplastin about prothrombin, with resultant formation of thrombin Ferguson and Erickson have also been able to activate the prothrombin of hemophilic "globulin substance" to normal thrombin, with resultant clotting, by

the addition of pure crystalline thrombin The plasma of individuals with hemophilia may be deficient in thromboplastic enzyme

Hemophilia

In last year's review the studies by Lozner and Taylor⁶⁵ on the coagulation defect in hemophilia were presented At that time their experiments revealed a deficiency in the globulin fraction of the plasma "Globulin substance" prepared from normal human plasma was found to hasten the clotting time for hemophilic blood, both in vitro and in vivo After several injections of this substance, however, a refractory phase occurred so that the clotting time rose to its original level despite continued injections When normal or lyophilized plasma was injected the refractory period was ended, indicating that whole plasma contained a substance that was effective

In a more recent publication, Lozner, Kark and Taylor⁶⁶ state that normal serum from which prothrombin and fibrinogen had been removed was still capable, when injected, of causing a prompt fall in the coagulation time of hemophilic blood, both in vitro and in vivo It was suggested that the loss of effectiveness of the globulin substance might be the presence of a factor in normal plasma which was lost in the acid precipitation of the globulin substance Therefore, globulin was prepared by dialysis by Lozner and Taylor,⁶⁷ and such a preparation of euglobulin was found to resemble normal human plasma in its ability to maintain in hemophilia a reduced level of the blood-coagulation time when injected intravenously every six hours One hopes that in time the results of these investigations will be to produce a substance which when injected periodically into a patient with hemophilia will maintain his blood at a normal coagulation level

Vitamin K

During the last few years, outstanding advances have been made in the troublesome and dangerous hemorrhage of jaundice Quick⁶⁸ deserves great credit for the initiation and development of these studies In obstructive jaundice or biliary fistula, where bile salts do not reach the intestinal tract, poor absorption of fat-soluble vitamins results Rarely, a severe dietary deficiency may lead⁶⁹ to a lowering of the vitamin K content of the body (Kark and Lozner) In the absence of fat soluble vitamin K there is lowering of the plasma prothrombin, with a resultant hemorrhagic tendency The plasma prothrombin level can be sustained by giving vitamin K concentrates and bile salts

by mouth. Blood transfusion is a rather inefficient method of combating the bleeding tendency due to hypoprothrombinemia, as its effect is slight and transient. After a 600-cc. transfusion in one patient, Stewart⁷⁰ found an increase of only 6 per cent of plasma prothrombin.

Rapid progress has been made in the chemistry of vitamin K. A rather large number of compounds with vitamin K activity have been found, and several of these have been identified and synthesized. When oral administration is uncertain because of vomiting or severe diarrhea, a highly purified preparation or one of the recently developed synthetic products may be used. In the synthesis of such preparations, Doisy and his collaborators⁷¹ at St. Louis and Fieser and his co-workers⁷² at Harvard have done outstanding work. Frank Hurvitz and Seligman⁷³ report 2 cases treated with Fieser's synthetic vitamin K. In both cases, a single intravenous injection of the substance resulted in a fall of the prothrombin clotting time to normal within a few hours.

The mechanism by which prothrombin is formed and its dependence on vitamin K are not understood. The liver has been regarded as the site of prothrombin formation because hepatoxins, such as chloroform, cause a plasma prothrombin deficiency, and because some patients believed to have severe liver damage have failed to respond to large amounts of vitamin K and bile salts. In the dog, total hepatectomy causes a rapid fall in plasma prothrombin.

Until recently, the mechanism in the condition known as hemorrhagic disease of the newborn has not been understood. Quick⁷⁴ suggested a prothrombin deficiency. In a study of 20 newborn infants, Waddell and Guerry⁷⁵ showed that the prothrombin clotting times were unusually high between the second and sixth days of life, corresponding to the time at which hemorrhagic disease almost always manifests itself. Administration of vitamin K concentrates orally kept the prothrombin and blood-clotting times normal. Routine use of such therapy in the infant or possibly in the mother late in pregnancy may be the answer to the prophylaxis of many cases of intra cranial hemorrhage during birth and of the occasional fatal bleeding following surgical procedures, such as circumcision early in life.

Owen, Hoffman, Ziffren and Smith,⁷⁶ who with Quick have contributed so much to our knowledge of vitamin K, have also simplified the prothrombin clotting test so that an easy bedside method is now available which correlates well with the more complicated procedures. It should be emphasized

that vitamin K is of no value in the therapy of any hemorrhagic condition except that of prothrombin deficiency. Thus it has no effect whatever in hemophilia, in thrombocytopenic purpura or in any other type of purpura.

Thrombocytopenic Purpura

Very little that is new has been written of thrombocytopenic purpura in the past year. Some new cases of purpura caused by the taking of Sedormid are reported. McGovern and Wright⁷⁷ point out that Sedormid may cause a serious hemorrhagic syndrome. They advise restriction of its sale except on a physician's prescription and caution on the part of the physician in recommending its use. In 1938, a slight sensation was occasioned by the appearance of data purporting to show that splenic extracts from cases of thrombocytopenic purpura resulted in marked reduction in platelets in rabbits. The substance causing this reduction was named "thrombocytopen."⁷⁸ Numerous investigations undertaken in an attempt to confirm this phenomenon have, however, proved uniformly unsuccessful.⁷⁹

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CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTHEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., Editor

CASE 26241

PRESENTATION OF CASE

First Admission (July 30 to August 21, 1935)
A twenty-three year-old housewife was admitted to the hospital, complaining of painless swelling of the right neck.

Approximately sixteen months before admission in March, 1934, the patient first noted a constant, non-radiating, dull pain, located in the right side of the neck, below the angle of the jaw, and over an area where there was a palpable, marble sized mass. Within a few weeks the soreness passed away, but the mass persisted, gradually increasing in size. She continued her work and detected little change in her general condition until about nine months before admission, when she developed a chronic cough, productive of small amounts of mucoid sputum, at the same time she began to tire easily and lose weight. Seven months before entry pain in the region of the right neck returned but again passed away within two weeks time. A similar discomfort then appeared in the region of the right axilla, over a palpable, firm, pecan sized mass. This discomfort continued, and the mass gradually enlarged. Two weeks before admission a dull pain (without palpable mass) appeared below the angle of the left jaw. Because of general malaise, weakness, easy fatigability and the gradually enlarging axillary and neck masses, the patient entered the hospital. It was stated that all the masses mentioned had grown slowly and had become firmer, but had remained non-tender and non-inflamed. The overlying skin had remained freely movable, as did the masses beneath it. She denied ever having had tuberculosis, periods of fever, chills, night sweats or hemoptyses.

The physical examination revealed a well developed and well nourished woman in no apparent discomfort. The skin showed a chronic generalized eczema with lichenification in the antecubital spaces, with residual dirty-brown pigmentations over the trunk and limbs, and with patches of depigmentation over the outer aspect of the left thigh, left popliteal space, and the left knee. The right neck bulged and there was fullness over the right shoulder and right anterior upper

chest. This was the result of the presence of various-sized ("olive to egg"), hard discrete, non-tender masses in the region. They were relatively fixed in the neck but movable elsewhere. There were several olive-sized, hard, discrete, movable nodes in the right axilla. The right pectoral and trapezius muscles also contained several more. The trachea was pushed to the left by a mass which filled the suprasternal notch. The inguinal regions were negative. Examination of the heart was negative except for the presence of a soft blowing systolic murmur at the apex. The blood pressure was 120 systolic, 64 diastolic. The lungs showed increased tactile fremitus, vocal fremitus and breath sounds in the entire upper half of the right lung anteriorly and posteriorly. The abdomen was negative. The liver and spleen were not palpated. The pelvic examination was negative.

The temperature was 99.2°F., the pulse 90, and the respirations 22.

Examination of the blood showed a red-cell count of 4,900,000 with 70 per cent hemoglobin (Tallqvist), and a white-cell count of 20,000 with 80 per cent polymorphonuclears, 8 lymphocytes, 9 monocytes, and 3 eosinophils, the smear was normal. The stools were negative. A blood Hinton test was negative. A basal metabolic rate was +17 per cent.

Röntgenograms of the chest showed an ill defined area of consolidation close to the right hilus, and a fusiform area of increased density in the anterior part of the right middle lung field corresponding to the septum between the upper and middle lobes. There was marked soft-tissue swelling of the right supraclavicular area, and some swelling of the right axilla.

The patient remained in the hospital for twenty-three days during which time she ran a Pel-Ebstein type of fever ranging from 99 to 101°F each day. On the fifth hospital day a biopsy of a cervical node was done. The pathological report was lymphoblastoma, Hodgkin's type. X-ray treatment was begun before her discharge, August 21, 1935 (Table 1).

Second Admission (June 9 to 23 1936) The patient had received three courses of x-ray treatment since her discharge from the hospital.

A film taken May 2, 1936 showed appreciable diminution in the area of dullness at the right lung root. She entered for the termination of a pregnancy of about two months duration. Hysterotomy and sterilization were performed four days after entry. All the laboratory findings at this time were negative.

Between the second and final admissions many x-ray films were taken and reported as follows June 29, 1936 the indefinite rounded area of diminished density within the chest was still present and appeared smaller December 10, 1936 the process was slightly less extensive, and the left lung remained clear January 30, 1937 the appearance of the right lung field remained unchanged, on the

diameter was made out at the level of the sixth interspace posteriorly, a large triangular dense shadow filled the right lower medial chest anteriorly June 19, 1938 there was extensive consolidation with fibrosis along the medial aspects of the right lung with displacement of the lung to the right and compensatory emphysema of the remaining lung field on the right, a small focus of con

TABLE 1 X-Ray Treatment, August, 1935, to April, 1939, Inclusive

| DATE | ANTERIOR MEDIAS- TINUM | POSTERIOR MEDIAS- TINUM | RIGHT NECK | RIGHT AXILLA | RIGHT ANTERIOR CHLST | RIGHT POSTERIOR CHEST | LEFT NECK | ABDO- MEN | ANTE- RIOR NECK | POS- TERIOR NECK | RIGHT LATERO CHEST |
|----------------------|------------------------------|-------------------------------|---------------|-----------------|----------------------------|-----------------------------|--------------|--------------|-----------------------|------------------------|--------------------------|
| | r | r | r | r | r | r | r | r | r | r | r |
| 1935 | | | | | | | | | | | |
| August | 600 | 600 | 600 | 600 | | | | | | | |
| September | | | 600 | 600 | | | | | | | |
| December | | | 600 | 600 | | | | | | | |
| 1936 | | | | | | | | | | | |
| March | 900 | 900 | | | | | | | | | |
| June to July | | | 600 | | 600 | 600 | | | | | |
| September | 1200 | 1200 | 600 | 500 | | | | | | | |
| December | | | | | | | 600 | | | | |
| 1937 | | | | | | | | | | | |
| April | | | | 600 | | | | | | | |
| June | | | 600 | 600 | 600 | 600 | | | | | |
| August | | | | | | | | 900 | | | |
| September | | | | 600 | 900 | | | | | | |
| October | | | | | | | | | | | |
| 1938 | | | | | | | | | | | |
| January | 900 | 900 | | | | | | | | | |
| February | | | 900 | | | | | | | | |
| April | | | | | | | | | 600 | 600 | |
| June | | | | | | | | | 900 | 900 | |
| September to October | 1500 | 1500 | | 600 | | | | | | | |
| October | | | | | | | | | | | |
| 1939 | | | | | | | | | | | |
| April | | | | | | | | | | | 300 |
| Totals | 5100 | 5100 | 4500 | 4100 | 2100 | 1200 | 600 | 900 | 1500 | 1500 | 300 |

left side, however, there were two irregular areas of density in the lower lung field, one extending from the level of the fourth rib to the fifth interspace anteriorly, the other lying just above the costophrenic angle February 13, 1937 the area of consolidation on the left had markedly cleared June 19, 1937 there was some increase in dullness laterally from the right hilus shadow October 23, 1937 the process on the right side had not appreciably changed, there was a new ovoid lesion, measuring about 2 by 1.5 cm, close to the left border of the heart September 18, 1937 extensive density still extended out from the right hilar region, the right diaphragm was markedly elevated in its medial portion, the left lung remained clear, there was considerable dorsal scoliosis February 19, 1938 considerable dense, irregularly mottled infiltration was noted radiating from the right hilus involving the medial portions of the right upper and middle lobes, also, what appeared to be a round cavity which measured approximately 1 cm in

solidation was noted at the fifth interspace on the left side laterally August 27, 1938 slight improvement in the appearance of the chest was observed, but the cavities were still present October 29, 1938 there was a destructive process in the right upper lobe with collapse of the right lower lobe, and a localized area of consolidation at the left lower lung field laterally, probably corresponding to the anterior portion of the lower lobe
Final Admission (April 7 to 11, 1939) Since her discharge in June, 1936, the patient had received frequent x-ray treatments which had apparently produced regression in many of the diseased areas previously noted In June, 1937, the patient began to complain of increasing weight loss and hemoptysis There developed a reappearance of matted nodes in the right neck region In August, 1937, or about one and a half years before the final admission, the patient developed discomfort and pain in the right shoulder, with weakness of the right arm, and a classical Horner's syndrome on the right The arm gradually became worse, and

the patient showed much emaciation. After three months of progressively increasing discomfort and pain in the arm, it became completely paralyzed, and a wrist drop developed. The cough became more severe and was productive of considerable amounts of sputum. In spite of continuing weakness, weight loss and easy fatigability she was still able to attend to her housework. Under x ray therapy the use of the right arm began to return. In December, 1938, the paralysis had markedly subsided, the weight had increased slightly, and the general condition improved. However, one month later, in January, 1939, her activities became definitely limited because of shortness of breath, progressively increasing weakness and the appearance of chills, fever, night sweats and upper respiratory infections. The dyspnea became so severe that she noted it on coughing or talking, but there was no chest pain. She was given x ray therapy to the right chest region, as had been done for a number of months previously, but in spite of all efforts, she went progressively downhill and was admitted to the hospital for terminal care.

Physical examination revealed a thin, emaciated cachectic young woman in moderate respiratory distress. There was dullness to flatness, with diminished fremitus and absent breath sounds over the right anterior chest, and coarse, moist inspiratory and expiratory rales with increased breath sounds were heard over the anterior and posterior left chest. Resonance, with bronchial breathing, was heard in an elliptical area overlying the medial border of the right scapula, just inferior to its spine and extending to the eighth rib below. Surrounding this area posteriorly the chest was dull to flat to percussion and the breath sounds were diminished to absent. The heart sounds were almost inaudible due to rales which masked them. The blood pressure was 98 systolic, 68 diastolic. There was a slightly tender, stony hard, nodular, laterally movable mass in the abdomen in the region about the umbilicus. There were many hard, non-tender, bilateral cervical and supraclavicular, pea sized to marble sized masses. Neurological examination revealed that the right pupil (2 mm) was smaller than the left (5 mm). Both pupils reacted to light and accommodation. The external ocular movements were normal and full. The fundi were negative. The right arm was found to lack sensation. Motions of the right shoulder were limited. The right elbow could be flexed only to a right angle. The muscles of the arms were atrophic.

The temperature was 101°F., the pulse 142, and the respirations 25.

Examination of the blood showed a red-cell

count of 5,400,000 with 82 per cent hemoglobin, and a white-cell count of 17,300 with 93 per cent polymorphonuclears, 6 per cent lymphocytes and 1 per cent eosinophils. Stools were guaiac negative. The blood protein was 6.6 gm per 100 cc. Roentgenograms of the chest showed that there was an increase in the destructive process in each side of the lung. The right upper lobe was completely involved, as were the greater portions of the lower and middle lobes. The heart was markedly displaced to the right, due to partial atelectasis. There were several small areas of cavitation visible in the region of the upper and middle lobes. There was an increase in the parenchymatous process of the lung on the left side.

The patient rapidly went downhill and died four days after admission.

DIFFERENTIAL DIAGNOSIS

DR. FREDERICK W. O'BRIEN: I think it is Boyd who quotes Goethe to the effect that what one knows, one sees. Since there was a positive biopsy in this case, I am prejudiced from the start. If you recall, the first film gives the impression of a right upper respiratory infection with some interlobar fluid. The blood picture was as characteristic as is any blood picture of Hodgkin's disease in the early stage. Sometimes you see more of an eosinophilia than is indicated here. We read in the history, "The liver and spleen were not palpated." I do not know precisely what that means.

DR. TRACY B. MALLORY: They were looked for and not found.

DR. O'BRIEN: It is not too unusual for the spleen and liver to appear normal to palpation in Hodgkin's disease. The fever curve referred to on the patient's first admission might make one think of the Pel-Ebstein form of Hodgkin's disease but could go equally well with tuberculosis. Tuberculosis and Hodgkin's disease in the same patient occur in young persons but are rather rare in adults. There is nothing said here about the character of the nodes. I presume because they were non-tender and non-inflammatory that they were not tuberculous nodes. Were any sputum examinations done in this case, and, if so, were bacilli found?

DR. MALLORY: They were never demonstrated, I can assure you. I think we can be sure they were looked for.

DR. O'BRIEN: Following x ray treatment there was an apparent change in the size of the area of infiltration seen close to the right hilus in succeeding films, however, I think it is more apparent

than real as one compares the series. If we look closely the suspicion of abscess formation arises. Following x-ray therapy one might expect some clearing of such a lesion. I am inclined to rule out tuberculosis because the lesions in the films which show a definite contralateral spread cleared up almost overnight after x-ray treatment. Furthermore, there was a Horner's syndrome in this case. I am not familiar with its occurrence in pulmonary tuberculosis. Brucellosis comes to mind in the differential diagnosis. Parsons and Poston* at Duke University recently reported 4 cases of brucellosis where the histopathology of the nodes was believed identical with that of Hodgkin's disease. Brucellosis, however, does not show the progressive lung changes seen here and I believe only affects the lungs terminally. Among the unusual things one must consider actinomycosis. It too may be a long-standing process but, as I understand it, does not involve the nodes, may involve the chest wall and is always accompanied by a sinus. In the presence of supraclavicular nodes, Horner's syndrome and the roentgen picture, carcinoma is a possibility. There is no evidence of rib destruction, which is seen in primary-sulcus tumor. Oat-cell cancer of the lung may improve under irradiation, but in any type of lung cancer I should not expect a generalized adenopathy of axillas, groins and mediastinum such as we have in this case, so that I am forced back to a diagnosis of Hodgkin's disease with infection. I say with infection because in the later films you see what appears to be cavity formation in an otherwise dense right upper lobe, and so far as I can learn, cavity formation does not occur in Hodgkin's disease except in the presence of superimposed infection. Interstitial involvement of the lungs occurs in about 30 per cent of the cases of Hodgkin's disease. One thing I should like to ask—I see no mention of it—is whether or not the nodes regressed under x-ray treatment.

DR EDWARD A GALL: They did originally. Later on the mass in the neck subsided only slightly.

DR O'BRIEN: One might well wonder whether the changes seen on the film in the right upper-lung field were brought about by overenthusiastic radiation. When you have a patient as ill as this one was and as badly in need of attention, it is difficult to treat the patient otherwise, but I think sometimes that we overirradiate. The question arises here whether irradiation produced the changes we see. They are not characteristic of any pulmonary fibrosis that I have recognized

as such following radiation. So I am forced again to conclude that we are dealing with Hodgkin's disease with superimposed infection.

DR MALLORY: Some of the audience may be interested in hearing more about this last question that Dr O'Brien has raised. What dosage of x-rays is necessary to produce x-ray pneumonitis?

DR O'BRIEN: I do not believe anyone knows. The individual case differs. We have had patients who received more irradiation than this woman with only a resultant fine pulmonary fibrosis, certainly nothing similar to what we see here. I do not believe this was all due to radiation.

DR JOHN H TALBOTT: I should like to raise the question of whether or not this may be acanthosis nigricans with peripheral manifestations. The skin pigmentation suggests that diagnosis so far as the first physical examination was concerned.

DR GALL: She had had that all her life.

DR LINGLEY: I should like to ask Dr O'Brien if he thinks it is necessary to postulate infection because of the presence of cavities in the lungs.

DR O'BRIEN: I have no authority for it, outside of talking to Dr Frederic Parker, Jr. His belief is that you do not see cavitation in Hodgkin's disease without superimposed infection.

DR DONALD S KING: We have seen cavities disappear under x-ray treatment.

DR LINGLEY: Yes. I remember 2 cases of Hodgkin's disease which were treated by x-ray with disappearance of the cavities, but we were never able to find infection. One of these cases came to postmortem and was still straight Hodgkin's disease.

DR KING: Of course you did not prove that it was not infected at the time.

DR LINGLEY: There is no characteristic fluid level which we should expect, and no pus or temperature or anything else to go with it.

CLINICAL DIAGNOSIS

Lymphoblastoma, Hodgkin's type, generalized

DR. O'BRIEN'S DIAGNOSIS

Hodgkin's lymphoma with pulmonary invasion and superimposed infection

ANATOMICAL DIAGNOSES

Lymphoblastoma, Hodgkin's type, involving lymph nodes and lungs

Fibrosis of lungs probably radiation pneumonitis

Ichthyosis

Hydropericardium

Hydrothorax

*Parsons P B and Poston M A: The pathology of human brucellosis report of four cases with one autopsy. *South M J* 32:7 13 1939

PATHOLOGICAL DISCUSSION

DR MALLORY This is a case where the pathologist, too, does not escape without a good many perplexities and troubles. When this patient came to autopsy the lungs presented a very extraordinary picture, unlike anything we had ever seen before. All five lobes showed lesions of one sort or another, and they differed in all five lobes. It is almost an impossible job to untangle the entire story. She had, of course, Hodgkin's disease. That had been proved at the original biopsy, and she still showed active characteristic Hodgkin's involvement of many lymph nodes at the time of autopsy. Even at the time of death the liver and spleen were free. The lungs contained a great many nodules that were clearly due to Hodgkin's disease. In addition, however, there were some other things. For instance, there was an ordinary terminal bronchopneumonia, undoubtedly infectious in origin, not extensive, but enough to complicate the picture. There were still some cavities at the time of autopsy. These cavities showed nothing to suggest tuberculosis. I should also be inclined to say that they showed nothing to suggest infection, although I think that is difficult to rule out. One of the most striking features was the right upper lobe which was completely lacking in air and was of a uniform leathery consistence. I think the degree of dense fibrous consolidation in the upper lobe is not indicated adequately in any of the films. It had shrunk enough so that the apparent apex of the lung consisted actually of the apex of the lower lobe. Aerated lower lobe tissue lay behind the upper lobe at all points, so that in the x-rays we get the appearance of at least some air in the apex of the lung, whereas there actually was none in the upper lobe.

Microscopic examination showed solid fibrosis of this entire lobe with extremely dense collagen and just an occasional remnant of an alveolus lined with cuboidal epithelium. Throughout this fibrous mass, however, one could still recognize persistence of alveolar walls. The elastic tissue had not been destroyed, and there was an alveolar pattern that could be brought out with the elastic tissue stain but which was quite invisible with the hematoxylin and eosin stain. Where we found recognizable Hodgkin's involvement of the lung in this case, there was always complete destruction of the lung architecture. In the upper lobe there was fibrous obliteration of all the air sacs but the architecture was not obliterated. Either this was once Hodgkin's disease and all the Hodg-

kin's cells were killed or sterilized by x-ray so we could no longer recognize them, or we must assume that this fibrosis of the entire lobe was due to something else. I can only guess what that something else might be. The largest mass of nodes was in the lower right neck and was very resistant to therapy. She had a great many treatments to the right side of the neck, and many treatments to the mediastinum and chest. Therefore there was a possibility of a good deal of cross-firing, and much of the radiation that she had may have accumulated in this one area. The experimental production of x-ray pneumonitis has never been carried to such an extent as to produce anything like this picture. I cannot say that it has ever been proved that radiation pneumonitis can consolidate a lung to this extent, but I think it is more likely that the changes were produced in that way than that they were a part of the Hodgkin's involvement.

DR MAURICE FREMONT SMITH What would be the effect of long standing atelectasis? Do you get a picture comparable to that?

DR MALLORY I have never seen such a picture from pure atelectasis alone. The architecture is still further complicated by the fact that there is very extensive obliteration of the blood vessels throughout the area. This is unusual in organized pneumonias. There is fibrous plugging of bronchi as well as alveoli. There is in some places in the lung, but not in this right upper lobe,—which is most puzzling,—actual tumor thrombosis of blood vessels by the Hodgkin's disease thus accounting for small areas of infarction. However, infarction always destroys the lung pattern so that we can exclude it so far as the upper lobe is concerned. The walls of the various cavities again showed fibrosis and no recognizable Hodgkin's disease.

A PHYSICIAN Did the Hodgkin's disease invade the bronchi?

DR MALLORY It had grown around the bronchi in many places, but so far as we could make out had not invaded them, certainly not the larger ones.

DR ALFRED KRANES Is it not unusual to have radiation fibrosis confined to one lobe?

DR MALLORY There are many spots of a similar process scattered throughout the other lobes. These can apparently be distinguished from the Hodgkin's disease. All the other foci are relatively small compared with this one major involvement in the right upper lobe.

CASE 26242

PRESENTATION OF CASE

A sixty-four-year-old man was admitted to the hospital because of mental disorientation with chills and fever.

Without apparent cause, approximately seven days before admission, the patient developed chills and a fever of 103°F, followed by a profuse sweat. A physician was called who prescribed "pills" and ordered the patient to remain in bed. However, his temperature remained at 100.6°F and he continued to have "chilly sensations." Five days before admission he arose from bed still feeling chilly, but otherwise fairly well. The following day he went to work as usual, but that evening he "shook all over." On the third and second days before entry he remained at home, but out of bed, saying that he felt fairly well, but on the evening of the second day before entry, he again felt very chilly and afterward became warm. He became overtalkative and seemed unreasonable and somewhat confused. His physician was called, and the temperature was reported as having been 105°F. The confusion persisted and increased somewhat on the day before admission and the temperature remained at 103°F all day. A pill prescribed by his doctor was vomited. Communication with the patient became somewhat difficult because of his confusion. Nevertheless his relatives believed that he had experienced headaches for some twenty-four hours before admission. Because of his symptoms he was admitted for study.

The past, marital and family histories were non-contributory.

Physical examination revealed a comatose, well-nourished man with shallow, slow, stertorous respirations. The skin was warm, clear and dry. The tongue was held in the mouth and appeared rough, moist and moderately coated. The throat was injected but without an exudate. Examination of the lungs was unsatisfactory because of shallow respirations. There was dullness at the bases posteriorly, up to the level of the ninth or tenth thoracic rib on each side. There were no definite signs of consolidation. The heart was described as normal. Examination of the abdomen was negative. There were varicose veins in the lower legs. Before admission the patient had been given morphine, and it was thought that part of the narcosis on entry was due to this.

The temperature was 103°F, the pulse 75, and the respirations 24.

A neurological examination, performed on the

third hospital day, revealed the following findings. The patient was in semistupor, from which he could be aroused without difficulty. He replied to questions with single words and at times apparently had considerable difficulty in finding a word. He named most familiar objects correctly, but failed with a pencil. Co-operation was not very good. The fundi were not definitely abnormal. The temporal margins of the nerve heads were sharp, and the nasal margins only slightly hazy. The visual fields were full. The pupils were normal. The external ocular movements were normal, and there was no nystagmus. There was a questionable right facial weakness when pressure was applied to the eyeballs. The right handgrip was weaker than the left. The tendon reflexes were a shade more active on the right. The abdominal reflexes on the right were absent, on the left, positive. The neck was rigid. The plantar responses were normal. There was no tenderness over the sinuses or mastoids.

Examination of the blood showed a red-cell count of 3,400,000 with 111 gm hemoglobin (photoelectric-cell technic), and a white-cell count of 35,000 with 94 per cent polymorphonuclears. The platelets were increased. Examination of the urine showed + to +++ albumin. The sediment on a few occasions showed from 1 to 5 red blood cells per high-power field. These occasional findings of hematuria were noted throughout his hospital stay. The blood Hinton test was negative. The serum nonprotein nitrogen varied from 25 to 43 mg per 100 cc, but was usually normal. A lumbar puncture revealed a spinal fluid which showed an initial pressure of 400 mm of water with a white-cell count of 3600 with 75 per cent polymorphonuclears, a total protein of 315 mg per 100 cc, a sugar test of 19 mg per 100 cc, chlorides of 639 mg per 100 cc and a gold-sol test of 4455556541. Culture and smear of the spinal fluid were negative for pathogenic bacteria.

Roentgenograms of the chest and mastoid regions were negative. The left antrum and frontal sinuses were slightly diminished in radiance. The superior wall of the left frontal sinus was hazy in outline and there was definite mottling in the frontal bone just above it. The appearance was suggestive of osteomyelitis, but further films did not confirm this finding.

A Type 29 pneumococcus was cultured from the sputum and blood. He was given sulfapyridine by mouth until the blood level reached as high as 161 mg per 100 cc, but the levels averaged around 6 to 10 mg. He responded poorly to this therapy, however, so it was augmented with Type

29 antipneumococcus rabbit serum, in amounts equaling some 140,000 units. In spite of this and frequent transfusions, fluid parenterally and orally, adequate sedation and general nursing care, the disease continued to run a stormy course. The physical and neurological examinations remained essentially the same throughout his hospital stay, except that at one time a faint systolic murmur was heard over the precordium, but this had occurred at a time when there was a high fever. Microscopic hematuria persisted, and the urinary sediment contained pyridine crystals. No stabs of pain were complained of, and no petechiae or clubbing of the fingers was noted. The clinical picture, rather, was focused entirely on the central nervous system where there were never any localizing neurological signs.

The patient remained in the hospital for twenty nine days, during which time his temperature spiked from 98 to 106°F and the pulse and respirations were likewise irregular. The antibody content of the blood against Type 29 pneumococcus was found to be high. Type 29 pneumococci were agglutinated by serum in dilutions up to 1:64. Because of the failure of all therapy, artificial fever treatment was attempted for a period of a few hours, but to no avail. Repeat lumbar punctures showed essentially normal pressures with high cell counts, proteins ranging around 240 mg per 100 cc., sugars around 20 mg per 100 cc., and chlorides about 595 mg per 100 cc. The spinal fluid contained neither agglutinins nor precipitins against Type 29 pneumococci. Accordingly the Swift-Ellis type of treatment was attempted, with the introduction of a few centimeters of the patient's serum into the spinal canal, but this proved of no avail. During the last ten days of the patient's life he ran a spiking temperature, ranging daily from 99 to 104°F, with corresponding swings in pulse and respirations from 100 to 130 and 30 to 35 respectively. The patient gradually grew weaker and less responsive and then suddenly, without warning, died on the twenty ninth hospital day or the thirty sixth day of his illness.

DIFFERENTIAL DIAGNOSIS

Dr. AUGUSTUS S. ROSE. The laboratory studies in this case delimit our problem. It is clearly indicated that we are dealing with a severe infectious process due to Type 29 pneumococcus. The clinical features suggest a meningitis, but as I will point out there are indications that the meningitis was secondary rather than primary and was not the actual cause of death.

If I might briefly review the important features

of the history, the patient was a sixty four year old man who suddenly without warning or apparent cause began to have chills and fever but who for five days was otherwise reasonably well. In fact on the fifth day he went to his work. The day before that he was up all day. Then suddenly, two days prior to admission, he became confused and overtalkative, and then gradually became semicomatose. When he entered the hospital we find that he had fever, a relatively slow pulse, stertorous respirations and stiff neck—signs which strongly suggest increased intracranial pressure and meningeal infection. This was later confirmed by lumbar puncture. The neurological examination indicated the possibility of changes in the left cerebral cortex or hemisphere. There was a questionable right facial weakness. The reflexes were slightly more active on the right side than they were on the left. The abdominal reflexes were absent on the right and he had some difficulty in choosing words. Any one of these findings alone would be difficult to interpret, but the fact that they all occurred together points definitely to some sort of localized abnormality in the left hemisphere. With the finding of cells in the spinal fluid and a sugar of 19 mg per 100 cc. we are in a position to say that the patient had a bacterial meningitis, in spite of the negative culture from the spinal fluid. The question arises, Where did this meningitis come from? I think we are safe in assuming that it was due to the pneumococcus. Pneumococci usually enter the meninges from two sources by direct extension from the paranasal sinuses or mastoid, or by way of the blood stream. The history in this case points to the blood stream as the probable source, but x-ray films suggested osteomyelitis of the left frontal sinus. Pneumococcal meningitis is a severe and often an overwhelming infection, and I do not believe that the first four days of this man's illness are consistent with that diagnosis. It is more likely that the meningitis developed two days before admission when his condition suddenly changed.

May we see the x-ray films?

Dr. RICHARD SCHATZKI. The x-ray evidence boils down to the appearance of the frontal sinuses. The other sinuses are fairly clear though there may be some chronic disease in one antrum. The left frontal sinus is different from the right. The wall is preserved but is less distinct than the one on the right side. These films were taken six days apart. The adjacent portion of the left frontal bone shows localized decalcification. How long had he been ill?

DR ROSE His symptoms began approximately one week prior to the time when the first x-ray film was taken

DR SCHATZKI These questionable areas are sharply defined, more so than one would expect from osteomyelitis of one week's duration. I think one can exclude osteomyelitis of six days' duration. I do not see any definite pus in the sinus. I think it could be an osteomyelitis of, let us say, three weeks' duration.

DR ROSE The report indicates that the second films did not confirm the findings of the first.

DR SCHATZKI I think the examiner changed his mind, because the films are practically the same.

DR F DENNETTE ADAMS Was there a chest plate?

DR SCHATZKI It does not show anything abnormal.

DR ROSE We are left somewhat in the air, having x-ray evidence that he possibly had a frontal sinusitis that might be of longer duration than his present illness although the early part of his illness hardly suggests this diagnosis. Certainly our record gives no history which leads us to suspect an acute frontal sinusitis. There were present none of the signs of a sinusitis or an osteomyelitis such as are usually found when extension of infection to the meninges occurs, for example, swelling or tenderness. So, I take the point of view that, if he had a sinusitis, it was probably of no significance in the development of his meningitis, unless it served as a possible source of the blood-stream infection. We are left, therefore, with the blood stream as the probable origin of his meningitis. The entire illness will be explained, it seems to me, if we can interpret the first five days of his illness. The history of chills and fever is consistent with a septicemia or at least a bacteremia, which we know was present shortly after admission.

We must now consider the possible sources of the pneumococcal bacteremia. We first turn to the respiratory tract and again find no evidence in the history. He had had no respiratory infection, complained of no sore throat or pain in the chest. The x-ray films of the lungs were negative, and although the throat was injected, apparently this was not due to a real pharyngitis. Nevertheless, the sputum contained pneumococci. We have mention of the veins of the leg as a possible focus, but we are told that there was no evidence of infection in them. We must, therefore, consider the heart as the possible source. Indeed, the entire

illness can best be explained by the diagnosis of pneumococcal endocarditis, even though it began without evidence of an infectious focus. For five days he had repeated episodes of chills and fever. He then suddenly became confused and semicomatose and showed signs of meningitis and of a questionable localized lesion in the left cerebral hemisphere. The illness was terminated after a protracted but steady downhill course with a picket-fence temperature curve and in spite of adequate treatment. The laboratory findings showed an anemia of moderate grade and red blood cells in the urine on a number of occasions. The physical examination, however, does not offer much support. There were no petechiae. The spleen was not enlarged, and the finding of a systolic murmur on one occasion was modified by the statement that it was heard at a time when the temperature was elevated. Nevertheless, in the absence of any other demonstrable focus, the clinical course of the disease is strongly in favor of this diagnosis.

Before considering this as the only diagnosis, we ought to consider the possibility of a brain abscess which existed prior to the development of his symptoms, with rupture of the abscess producing the sudden onset of meningitis and subsequent infection of the blood stream and a continuous downhill course. I believe that the evidence is against a brain abscess that developed either before the onset of his present illness or during it. The fundi were normal, indicating that he did not have chronic increased pressure, although the first lumbar puncture showed an elevation of pressure. Furthermore, repeated tapings showed that the pressure subsequently remained low. This would not be expected if an abscess was present. In addition, the neurologic signs did not change significantly, as would be the case in an expanding lesion.

I am not sufficiently informed to discuss the therapy administered in this case except to say that a sulfapyridine level in the blood of 6 to 10 mm is a level which is capable of producing a satisfactory therapeutic response. I do not know why fever therapy was used and I am puzzled by the use of the term "Swift-Ellis treatment," by which is usually meant the injection of neoarsphenamin intravenously and the subsequent injection of the patient's arsphenaminized serum intrathecally. Did they use neoarsphenamin?

DR TRACY B MALLORY I do not believe any neoarsphenamin was given. They merely injected his own serum into the spinal canal, in order to produce a higher concentration of antibodies in the subarachnoid space.

DR. ROSE In summary, therefore, I believe the evidence points to the diagnosis of pneumococcal bacteremia with secondary pneumococcal meningitis and possibly septic cerebral infarct and pneumococcal endocarditis.

DR. CHARLES L. SHORT I saw this case for only one purpose and that was to give fever therapy. The reason for this rested on some experiments showing that pneumococci *in vitro* may be more susceptible to sulfapyridine if the temperature is raised. So, all other measures having apparently failed, this patient was given fever therapy with radiant heat and his temperature kept above 103°F for about four hours. This principle of treatment is not new. It has been used in the treatment of syphilis, combining chemotherapy with fever therapy, and also in the treatment of gonorrhea. As you see, there was apparently no beneficial effect from the fever therapy.

To answer Dr. Rose's comment, the patient it is true, was having fever all along but if you examine the chart you can see that he was running a low fever with occasional spikes, but only after the fever therapy did he go into the period of intermittent high pyrexia.

DR. CHAMBERLYN We did a great deal of laboratory work which in retrospect is interesting. In the first place, he had a negative spinal-fluid culture on entry with a positive blood culture. That should have been of a great deal of significance in the light of the subsequent diagnosis of endocarditis, because a true spreading leptomeningitis should give positive cultures in the spinal fluid. On entry he had no agglutinins in the blood or spinal fluid. With full blown endocarditis we are accustomed to find a maximal concentration of agglutinins in the blood serum. Dr. Kubik and I talked over the question of endocarditis at that time, but there was no supporting clinical evidence. I believed that endocarditis could be fairly well excluded and Dr. Kubik also thought that it was unlikely. After we gave him immune serum the serum agglutinin level came up to 1:12, but instead of dropping it progressively rose during the subsequent hospitalization to a concentration of 1:64. That is an extremely high agglutinin titer and one which I believe should be diagnostic of endocarditis. He had negative chest signs, and we were never able to demonstrate any pulmonary infarction which one might have expected to find had the intravascular sepsis been a thrombophlebitis rather than an endocarditis. The subsequent blood cultures were negative by the routine method and in dilutions, but there was one experiment which was rather interesting. The question of sulfapyridine fastness of this organism came up. We took his

blood containing pyridine in a known level and a normal blood with a similar amount of pyridine and did a bactericidal experiment. The normal blood killed the pneumococcus perfectly well although there were no agglutinins in the serum, whereas the patient's blood contained agglutinins but failed to kill the organism. We have as yet no explanation for that. It may be that the blood contained some pneumococci which we were unable to grow because of the concentration of the pyridine. But when we intensified the bacterial implantation by adding bacteria to the blood we increased the size of the inoculum sufficiently to overcome the bacteriostatic effect of the pyridine.

I should like to point out the fact that this method of using immune serum intrathecally is hazardous. We believe it is in general a bad principle in the treatment of meningitis. Sufficient meningeal irritation may occur to permit further abscess formation, hence there may not be so many successful recoveries if serum is used intrathecally. I believe from these studies that we have followed this patient from the onset of an endocarditis through to its fatal termination.

DR. CHARLES S. KUBIK It might be of interest that there were 175 red cells in the first spinal fluid, 75 in the second two days later and again in the third fluid five days after that, but none subsequently. In the other cases of meningitis complicating bacterial endocarditis there have usually been some red cells, often a larger number than in this case. The combination of red cells in a purulent fluid, and particularly a xanthochromic purulent fluid, while not diagnostic, should lead one to think of subacute bacterial endocarditis. As Dr. Lyons has remarked we considered that as a possibility when the patient was first admitted but did not give it enough consideration later.

CLINICAL DIAGNOSES

Bacteremia (Type 29 pneumococcus)
Pneumococcal meningitis.
Multiple meningeal abscesses?

DR. ROSE'S DIAGNOSES

Pneumococcal bacteremia.
Pneumococcal meningitis (secondary)
Septic cerebral infarction?
Pneumococcal endocarditis?
Chronic frontal sinusitis?

ANATOMICAL DIAGNOSES

Bacterial endocarditis, acute, Type 29 pneumococcus.
Pneumococcal meningitis, embolic.

Infarcts of spleen and kidneys
Exostosis of orbital plate of frontal bone

PATHOLOGICAL DISCUSSION

DR MALLORY The autopsy did show bacterial endocarditis. There were very large vegetations—1 to 2 cm in diameter—on the mitral valve. There was no evidence of any preceding rheumatic involvement of the valve, but we know that with pneumococcal endocarditis such precedent valvular deformity is not necessary. There were

emboli and consequent infarction in the spleen and kidneys. In the brain there were no gross infarcts, but there was a fairly diffuse meningitis. Microscopically small areas of partial infarction were noted. The frontal sinuses showed no infection, but there was a unilateral hyperostosis behind the left one which undoubtedly accounts for the unusual x-ray picture.

DR ADAMS How often do you see pneumococcal endocarditis arise out of a clear sky?

DR MALLORY It is not very common but it does happen.

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PROLONGED RESIDENCIES THEIR EFFECT ON MEDICAL EDUCATION

DURING the last twenty years there has been an evident tendency toward the prolongation of the periods of medical internship and residency. With the development of the boards of certification in the specialties this has been accelerated, and now that internal medicine and general surgery are included, it has become a problem of major importance to the entire profession. Schedules of four, five and even six years have been recommended or put into effect. As yet, however, little consideration has been given to the ways in which such a radical shift will affect medical education, hospitals and the young physicians who must go through this prolonged and rigorous training, and finally the practice of medicine. The following paragraphs deal with the first of these problems, and the others

will be discussed in subsequent issues of the *Journal*.

There are two phases of medical education, each characterized by emphasis on a particular educational method. One, which may be termed the academic, is devoted to the accumulation of knowledge of the fundamental sciences on which medicine is founded—the biology of man, the second consists of training in the application of these sciences to clinical practice and of familiarization with the techniques involved. The former is appropriately provided by an academic institution, the latter can best be acquired by an apprentice system that involves gradually increasing responsibility under adequate supervision—in present-day terms, an internship or residency. On the appropriate application of these two educational methods and on a proper balance between them depends the success of medical education.

In this country the emphasis has swung pendulum like from one to the other. The apprenticeships of the Colonial Era and the early years of the Republic gave way, with the founding of medical schools, to a period of unalleviated didacticism in the middle portion of the last century. The reintroduction of bedside teaching in the rapidly growing charity hospitals started a trend in the reverse direction, which developed steadily into the clinical clerkships and intern systems of the first third of this century. To-day, with internship and residency programs stretching over periods of four to six years, apprenticeship dominates medical education to an even higher degree. But since it is in hospitals that this apprenticeship must be served now and in the future, one may reasonably ask, How many hospitals possess staffs capable of offering a genuinely educational program over so extensive a period? Dean Rappleye,* of Columbia, after prolonged study of the situation, is justifiably skeptical of their ability and, almost alone among the administrators of the large medical schools, calls for close co-operation between schools and hospitals in the development of such programs.

The great majority of medical schools have stood decorously aloof or have more or less openly im-

*Rappleye, W. C.: The challenge to medical education. *J. A. M. A.* 1941, 114, 1940.

plied that this phase of medical education is no concern of theirs. Yet it is from those who are trained by this apprenticeship that their clinical faculties will soon be recruited. Far from evincing concern over the diminishing proportion of medical education that they control they have treated with almost complacent neglect the recommendation of the Advisory Board of Medical Specialties, namely, that all candidates return after a period of internship to a further year of work at the medical schools in one or more of the basic sciences.

Is the preclinical training in the present medical schools so adequate that such a year would be superfluous? Does anything more fundamental than custom and administrative convenience demand that all academic work should precede the first contact with a sick human being? Experience in teaching a basic science not only in the preclinical period but also to fourth-year men and graduate students strongly indicates that the answer to both questions should be, No. Furthermore, in many other fields of education, experiments in the alternation of periods of academic instruction with those of practical experience have proved highly successful, and the avidity with which graduate students seize on scientific material which can be correlated with clinical experience indicates that the method is pedagogically sound.

Surely the time is ripe for a re-evaluation of all medical education. In view of the appalling number of years to which it has been prolonged this can hardly be too extensive. The study should include the premedical years, with a view to the admission of students to the medical schools at an earlier age. It should consider the feasibility of telescoping at least one of the clinical years into the basic internship, and it should seriously consider the advisability of a return to academic work after internship for those desiring advanced training.

MILK GOOD, BETTER, BEST

CONSIDERABLE water has gone over the dam in the last two or three years in relation to the milk industry, none of it has gone into the milk, either

chemically or economically. Milk standards have tended steadily to improve, milk profits have continued to be precarious, with relatively high costs of production and an uncertain and unsatisfactory volume of consumption. Government, union and farmer-labor price-fixing, Mayor LaGuardia's public proclamation urging substitution of Grade B for Grade A milk to combat the cost of the latter, and the blast at the business in the November issue of *Fortune*, under the title "Let 'Em Drink Grade A," have not served to smooth the path of an essential industry.

The main theses of the broadside in *Fortune* were that consumers do not use so much milk as they should because of high price, that the price of milk is too high and could be reduced, that milk can be sold through stores at four cents a quart less than through home-delivery, that organized labor and organized farmers have in many markets arbitrarily raised wages and farm prices to uneconomic levels, and that the milk distributor has helped to support this policy in order to keep consumer prices at high levels. Dr. Edward Fisher Brown, writing for the Milk Research Council, refutes these statements. Price of milk is not arbitrarily set by money-grabbing milk companies, but is determined by a number of relatively fixed charges—a price paid to the farmer that is set in many important markets by the federal or state government, a wage scale negotiated with labor unions, the cost of supplies and taxes. Retail price is raised but little by company profits, this increase was shown by an audit in New York State not to exceed three-eighths of a cent a quart. Furthermore, Dr. Brown points out that high consumer prices diminish consumption, and that profit comes not with decreased but with increased consumption, hence the main interest of dealers is to cut costs, thus increasing the sale of milk.

The policy of milk grading is a sound one, excluding the ballyhoo that has been raised about certain fancy "premium" milks. From a medical point of view there should be some guarantee that all grades of milk are safe. This is ensured if minimum standards are invoked as in Boston, where market milk may have no more than 400,000

bacteria raw, and, of recent date no more than 20,000 pasteurized, and can be sold only pasteurized. Grade A milk may now have only 50,000 bacteria raw, and 5000 pasteurized, and certified milk, produced under the direction of the Boston Medical Milk Commission, may have only 5000 bacteria in its raw state and only 100 after pasteurization. Add a price difference of only four or five cents a quart between certified and Grade A milk, and the choice of the former as the milk par excellence seems justified.

Even assuming that all grades of milk are safe for the consumer, the marketing of better grades of milk with fewer bacteria, more calories, greater freshness and a higher vitamin and mineral content is logical, sound and ethical business. No reason exists for abolishing porterhouse steak simply because some consumers can afford only hamburger. In this direction lies totalitarianism.

MEDICAL EPONYM

CARDARELLI - OLIVER SIGN

"Sulla pulsazione del tubo laringotracheale, come segno di certi aneurismi dell'arco aortico [Pulsation of the laryngotracheal tube as a sign of certain aneurysms of the aortic arch] was described by Professor Antonio Cardarelli (1831-1927) in *Il movimento medico-chirurgico* (1 223-229, 1872). A portion of the translation follows:

On observing the anterior aspect of the neck, I noted that the whole laryngotracheal tube was shaken by a rhythmic and easily perceptible impulse, and this was all the more noteworthy and important since the pulsation of both carotid arteries was feeble. This pulsation of the laryngotracheal tube was much more notable in another case [in which] it was not only perceptible on laying the fingers on either side of the tube, but was perceptible on inspection of the thyroid gland, which with every arterial pulsation was carried toward the right.

Six years later, the following letter from Surgeon Major W S Oliver, dated September 13, 1878, was printed in the *Lancet* (2 406, 1878), under the title "Physical Diagnosis of Thoracic Aneurism."

As the diagnosis of thoracic aneurism of the aorta is often difficult and obscure, notwithstanding the various physical means we have now at our disposal for detecting it, I am desirous of mentioning a method of examination which has afforded me material assistance in diagnosing this disease (or even simple dilatation of the vessel) when it occurs as is most generally the case, either in the ascending or the first part of the transverse portion of the arch.

The process is as follows: place the patient in the erect position, and direct him to close his mouth and elevate his chin to the fullest extent, then grasp the cricoid cartilage between the finger and thumb and use gentle upward pressure on it, when it dilatation or aneurism exists, the pulsation of the aorta will be distinctly felt transmitted through the trachea to the hand. The act of examination will increase laryngeal distress should this accompany the disease.

R W B

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., Secretary
330 Dartmouth Street
Boston

PYELITIS OF PREGNANCY TREATED WITH SULFANILAMIDE

Mrs. D J C., a twenty-eight year-old primipara thirty-six weeks pregnant, was seen at home on March 20, 1939, because of severe back pain, chilliness and general malaise. On examination the temperature was found to be 100.6°F., and the pulse 115. There was marked bilateral costovertebral tenderness. A probable diagnosis of acute pyelitis was made, and the patient was sent to the hospital.

The patient's past history was essentially negative. Catamenia began at fourteen, were regular with a twenty-eight-day cycle and lasted four days without pain. The last period was July 16, 1938, making confinement due April 23.

The patient was first seen on September 18, 1938, at which time a physical examination was essentially negative except for an enlarged uterus which was consistent with the duration of the amenorrhea. The urine was negative. The hemoglobin was 70 per cent, and because of this, the patient was told to take 5 gr of ferrous sulfate three times a day.

Except for some gastric disturbance, possibly due to the iron, the pregnancy progressed uneventfully until the date above mentioned. On admission to the hospital the white-cell count was found to be 15,000 and a catheter specimen of urine showed a large amount of pus. The hemoglobin was 52 per cent, and the red-cell count 3,030,000. She was started at once on 15 gr of sulfanilamide four times a day and a red-cell count and hemoglobin determination were made every other day.

On March 21 the temperature did not go above

A series of selected case histories by members of the section will be published weekly, questions and questions by subscribers are solicited and will be discussed by members of the section.

99.2°F, and thereafter was normal. She was discharged on March 25, completely relieved symptomatically but still showing pus cells in the urine. Urine culture had shown a colon-bacillus infection. Sulfanilamide was discontinued when she was discharged from the hospital.

The patient continued to show pus in the urine but remained symptomatically well and afebrile until April 15, when she had a recurrence of back pain with a temperature of 102°F and was readmitted to the hospital. She was again started on 15 gr of sulfanilamide four times a day. On April 16 the temperature was 101.2°F, on April 17 it was normal. Vaginal examination showed the head engaged in the pelvis, the cervix partly taken up and the os almost admitting two fingers. In view of the proximity to term and the state of the cervix, it was decided that induction of labor was the best treatment. This was done, and the patient was delivered of a 7-pound, 5-ounce, infant in good condition. In view of the urinary infection, it was thought best to forestall any urinary retention by immediately putting the patient on constant drainage. Sulfanilamide was omitted following delivery. The puerperium was entirely afebrile. The catheter was removed on the fourth day, following which the patient voided normally. The patient was discharged well on the fourteenth day. Examination of the urine a week later showed no pus.

Comment. Sulfanilamide in the treatment of pyelitis during pregnancy has had such success that it is probable that its use will become routine. The results in this case in which no renal lavage was undertaken would lead to the belief that lavage of the kidney is perhaps entirely unnecessary. It is much too soon to draw any conclusions as to whether the drug prevents the kidney damage that was seen so often following recurrent attacks of pyelitis.

VETERANS' INFORMATION ON DEATH CERTIFICATES

The attention of all fellows is invited to Sections 9 and 10 of Chapter 46 of the General Laws which require that the status of the deceased as a veteran must be determined by the physician signing the death certificate. Failure to supply this information renders the physician liable to a fine.

There has been some misunderstanding on the part of local authorities in this connection, and in many cases the entire death certificate, with the exception of the medical certificate, is filled out by the undertaker or other persons.

It is understood that the Secretary of State is preparing a new form to correct this misunderstanding but, in the

meantime, great care should be used by the physician in checking this item.

ALEXANDER S. BEGG, M.D., *Secretary*

DEATH

STANLEY—JOSIAH M. STANLEY, M.D., of Northboro, died June 4. He was in his eighty-first year.

Born in Methuen, he attended Yale University and received his degree from the New York University Medical College in 1884. After serving his internship at Bellevue Hospital, New York City, he took a postgraduate course at Harvard Medical School.

Dr. Stanley was town and school physician for twenty-five years in Northboro. He was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

Erratum. Through an error, it was announced in the June 6 issue of the *Journal* that Dr. George G. Sears died on May 27, the correct date is May 28.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR APRIL, 1940

| DISEASES | APRIL 1940 | APRIL 1939 | FIVE YEAR AVERAGE* |
|--------------------------|---------------|---------------|-----------------------|
| Anterior poliomyelitis | 0 | 1 | 0 |
| Chicken pox | 1286 | 719 | 1058 |
| Diphtheria | 11 | 9 | 17 |
| Dog bite | 937 | 938 | 916 |
| Dysentery bacillary | 24 | 7 | 5 |
| German measles | 55 | 96 | 1939 |
| Gonorrhea | 368 | 355 | 440 |
| Lobar pneumonia | 522 | 607 | 577 |
| Measles | 2464 | 4063 | 3242 |
| Meningococcus meningitis | 5 | 4 | 16 |
| Mumps | 756 | 708 | 1052 |
| Paratyphoid B fever | 3 | 0 | 8 |
| Scarlet fever | 756 | 767 | 1163 |
| Syphilis | 479 | 423 | 502 |
| Tuberculosis pulmonary | 206 | 224 | 319 |
| Tuberculosis other forms | 20 | 30 | 34 |
| Typhoid fever | 10 | 8 | 6 |
| Undulant fever | 4 | 2 | 3 |
| Whooping cough | 625 | 798 | 105 |

*Based on figures for preceding five years.

RARE DISEASES

Diphtheria was reported from Fall River, 3, Fitchburg, 1, Lawrence, 1, Northbridge, 1, Somerville, 1, Watertown, 1, Wrentham, 3, total, 11.

Dysentery, bacillary, was reported from Arlington, 3, Belchertown, 7, Belmont, 1, Boston, 1, Brookline, 2, Greenfield, 1, Lowell, 8, West Boylston, 1, total, 24.

Malaria was reported from Cambridge, 3, total, 3.

Meningococcus meningitis was reported from Brockton, 2, Framingham, 1, Orange, 1, Quincy, 1, total, 5.

Paratyphoid B fever was reported from Beverly, 1, Dedham, 1, Milton, 1, total, 3.

Pellagra was reported from Boston, 1, Winchester, 1, total, 2.

Pfeiffer bacillus meningitis was reported from Charlestown, 1, total, 1.

Septic sore throat was reported from Belmont, 1, Beverly, 1, Boston, 4, Brockton, 1, Cambridge, 4, Chicopee, 1, Fall River, 1, Georgetown, 1, Lexington, 1, Lynn, 1,

Malden, 3 Medford 4 Melrose 1 Milford, 1 Milton 1 New Bedford, 1 Salisbury 1 Somerville, 1 Waltham, 1 Wakefield, 1 West Springfield, 1 total, 32.

Tetanus was reported from Fall River 1 Worcester 1 total, 2.

Trachoma was reported from Watertown, 1 total 1

Trichinosis was reported from Newton 1 total, 1

Typhoid fever was reported from Framingham 1 Somerset, 1 Somerville, 7 Worcester 1 total, 10.

Undulant fever was reported from Ashburnham 1 Dedham 1 West Springfield 1 Worcester 1 total 4

Typhoid fever had its highest April incidence since 1935. A focus in Somerville accounts for the major part of this increase.

Bacillary dysentery primarily of the Sonne and Hiss-Y types, continues to be reported well above the five year average.

The reported incidence of chicken pox is slightly above the five year average.

German measles, measles, mumps and scarlet fever were reported well below the five year average.

Gonorrhea syphilis and meningococcus meningitis were reported at expected levels.

There was nothing remarkable in the reported incidences of anterior poliomyelitis, diphtheria lobar pneumonia, tuberculosis, whooping cough and undulant fever

NOTE

At the recent annual meeting of the American Laryngological Association, held at Harrison New York, Dr Gordon Berry of Worcester Massachusetts, was elected president and Dr Charles T. Porter of Boston, first vice president.

CORRESPONDENCE

GUAIKADYL

To the Editor During the past two years I have received numerous requests from physicians throughout New England for information regarding the product Guaiakodyl. These requests are based on the fact that the manufacturers of this product gave me a quantity to use in the Pulmonary Clinic at the Massachusetts General Hospital. I should like to state briefly the results of its use.

This material contains 0.05 gm. of guaiacol and 0.025 gm. of cecodylic acid per cubic centimeter of water. The total of approximately 500 cc. was given to a group of seven patients. The doses ranged from 1 to 4 cc. intramuscularly at intervals of one to three days. The largest amount to one patient was 138 cc. over a period of two months. Routine complete urine examinations were done frequently on all patients, and no difficulties were noted with the use of the product other than the complaint of transient dizziness which frequently followed the injections. No evidence of renal or skin irritation was noted. The patients all had bronchiectasis. There was no change in the course of the disease. The patients said that the material caused them no difficulty and all stated that the sputum was thinner and that they were able to raise it more easily while they were taking the medicine. The patient receiving the large dosage had extensive disease with multiple cavities and foul sputum. The foulness was converted to a creosote odor and both the patient and the family were convinced that the drug made things much more pleasant for all concerned. Guaiacol by mouth had caused a severe gastritis in this patient.

It seems that this product is harmless in the quantities used, and that it is a satisfactory expectorant and deodorant, particularly in a case with foul sputum. Through the manufacturers I have contacted a number of reliable physicians who have been using this product, and these doctors state that a total of approximately 5000 cc. of this material has been used by them without any ill-effects.

JOHN W. CASS, JR. M.D.

1101 Beacon Street,
Brookline Massachusetts.

ARTICLES ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

To the Editor In addition to the articles enumerated in our recent letter the following have been accepted

McKesson and Robbins, Inc.

McKesson's Ascorbic Acid Tablets, 25 mg

Shark Industries

Shark Liver Oil

Sharp and Dohme, Inc.

"Lyovac" Antivenin (Nearctic Crotalidae) Pol
yvalent

Smith Kline and French Laboratories

Benzedrine Sulfate Ampules, 10 mg., 1 cc.

The Upjohn Company

Ampoules Sterile Solution Caffeine with Sodium
Benzoate, 0.5 gm. (7½ gr.) 2 cc.

Hypodermic Tablets Caffeine with Sodium Benzo-
ate, 0.065 gm. (1 gr.)

John Wyeth and Brother Inc.

Thyroid Tablets

PAUL NICHOLAS LARCH Secretary

535 North Dearborn Street,
Chicago, Illinois.

REPORTS OF MEETINGS

HARVARD CHAPTER OF NU SIGMA NU

At the Harvard Medical School on February 29 the Harvard Chapter of Nu Sigma Nu presented Dr. D. D. Van Slyke, of the Rockefeller Institute, New York City.

The speaker recounted physiological studies of the kidney which originated from an attempt to explain the mechanism that maintain the constancy of the urea clearance under conditions of varying blood concentration. In a normal man the kidneys excrete per minute the amount of urea contained in about 75 cc. of blood. The "urea clearance" is 75 cc. per minute. If the blood-urea concentration is doubled the excretion rate doubles, so that the kidneys still clear 75 cc. of blood per minute.

In experiments with dogs in which the renal veins were made accessible by Rhoads' "explanting" in operation, it was found that this constancy of the clearance in the presence of changing blood-urea concentration is due to the fact that the kidneys regularly remove from the renal blood a constant fraction, approximately one twelfth of the urea. This occurs whether the blood-urea concentration is high or low. Consequently if the renal blood flow is constant, the urea clearance remains constant. Va

riations in the clearance could be induced in dogs by varying their renal blood flow, but the fraction of urea removed remained the same. In man, if the kidneys, as in the dog, remove one twelfth of the urea from the renal blood, the average clearance of 75 cc. indicates a renal blood flow of 900 cc. per minute, and other data indicate that this is in fact about the rate of blood flow through human kidneys.

Under ordinary conditions, the urea clearance appears to vary in proportion to the renal blood flow. It falls when the renal blood falls, when, as in shock, blood is withdrawn from the peripheral circulation, or when, as in chronic nephritis, destruction of glomerular tissue cuts down the channels for renal blood flow. The clearance has been useful in following the progress of Bright's disease. When the urea clearance falls to 5 per cent of normal, and not until then, death in uremia is imminent. In acute nephritis the clearance may fall to 10 per cent of normal, and recovery still occur, if the clearance begins to rise within four months.

The extracted fraction of the urea in the renal blood does not appear, under all conditions, to remain constant at one twelfth. Smith and Goldring, estimating the renal blood flow in man from the Diodrast clearance, have found that under the influence of adrenalin and of certain other factors the clearance can undergo wide variations without variation of the renal blood flow. Under these conditions, the variations are due to changes in the extracted fraction. Smith and Goldring's explanation is that constriction and relaxation of the efferent glomerular arterioles occur under the influences mentioned, and thereby vary the blood pressure in the glomerular capillaries. As a result, parallel variations are caused in the proportion of plasma water which, according to the filtration-reabsorption theory, is filtered in the glomeruli. These variations in filtration compensate for changes in renal blood flow rate, and leave the clearance constant.

The theory of renal excretion mentioned accords with all the known facts of renal physiology, and aids in their comprehension, it was asserted. It is based on work by Cushny, Richards, Marshall, Smith, Shannon and others. According to it, as the blood perfuses the kidneys part of the plasma water is filtered into the glomerular capsules. Richards and his colleagues have collected the filtrate from individual glomeruli of frogs' kidneys, and have shown by ultramicroanalyses that it is a true plasma filtrate, containing all the filterable substances of the plasma in the same concentrations as those in the plasma.

The proportion of plasma water filtered was made the object of study in the speaker's laboratory by observations on dogs with kidneys explanted by Rhoads. It was found to average 20 per cent of the entire plasma water. With this water is filtered 20 per cent of the urea, uric acid, sugar and so forth dissolved in the plasma.

As the filtrate passes down the tubules the greater part of the water, an average of about 98 per cent in man, is reabsorbed into the blood. This reabsorption is necessary, for the volume of the glomerular filtrate formed in twenty-four hours by a man is calculated to be about 150,000 cc. This much has to be filtered to remove waste products at a physiological rate, but the water must be taken back or man in a dry environment would be in continual danger of death from desiccation.

With the water some of the dissolved substances of the glomerular filtrate are partly or completely reabsorbed. They may be divided into three groups: substances, like glucose, that the body needs to retain completely, and that are completely reabsorbed so that none escape in the urine; substances like sodium chloride, of which a certain amount needs to be retained in order to maintain physio-

logical composition of the body fluids—of these substances the renal tubules reabsorb what is needed, the excess passing into the urine, and substances that are merely excretory waste products, like urea and creatinine, and for which there is no physiological reason for reabsorbing. The tubules do not reabsorb these last substances actively, and in fact act as a barrier to their diffusion into the blood with the reabsorbed water. This barrier is not perfect, and some of the filtered urea and uric acid diffuse back, but the proportion is slight compared with that of the substances in the first two groups.

Dr. Van Slyke mentioned how the alkali reserve of the body is maintained by this process of selective reabsorption. The sodium bicarbonate that is filtered out in the glomeruli is almost completely reabsorbed in the tubules. Furthermore, ammonium bicarbonate is formed in the kidney and is apparently extruded into the proximal part of the tubule, then in the distal part a combined chemical and physiological reaction occurs whereby the ammonium bicarbonate combines with the sodium chloride filtered from the glomeruli, and sodium bicarbonate is reabsorbed while the ammonium chloride passes into the urine. The effect of this process is to replace blood sodium chloride with sodium bicarbonate. Simple reabsorption of filtered sodium bicarbonate, first mentioned, prevents loss of bicarbonate from the blood. But the replacement of sodium chloride by sodium bicarbonate through the above chain of events adds to the bicarbonate reserve of the body. Through this mechanism ammonia enables the body to restore its alkali reserve when it has been depleted by acidosis.

The speaker concluded that the filtration-reabsorption theory accords with what is known concerning the processes by which the kidneys prevent the escape of glucose into the urine, regulate the volume and electrolyte content of the body fluids, excrete waste products of metabolism and regulate the acid-base balance of the body.

NOTICES

ANNOUNCEMENTS

JOHN HOMANS, M.D., announces the opening of an office at 311 Beacon Street, Boston.

JOSEPH H. MEZER, M.D., announces the removal of his office from 270 Commonwealth Avenue to 520 Beacon Street, Boston.

ROBERT J. SHERMAN, M.D., announces the opening of an office at Guild Square, Norwood.

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, June 18, at 12 o'clock noon. Dr. Paul D. White will speak on "The Doctor and His Heart."

Physicians are cordially invited to attend.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING SUNDAY, JUNE 16

TUESDAY, JUNE 18

*12 in The Doctor and His Heart. Dr. Paul D. White. South End Medical Club headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston.

JUNE 23-25—Maine Medical Association Annual meeting Bangor Lakes

- June 25-27—Medical Library Association. Page 862 issue of May 16.
 June 27—Penrocker Association of Physicians. The Try-Angle, Grove-land.
 September 2-6—American Congress of Physical Therapy. Page 862, issue of May 16.
 October 5-11—American Public Health Association. Page 655 issue of April 11.
 October 11-12—Pan-American Congress of Ophthalmology. Page 858, issue of May 23.
 December 15-1940 Graduate Fellowship of the New York Academy of Medicine. Page 938, issue of May 30.
 December 21—American Board of Internal Medicine, Inc. Page 369 issue of February 29.

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

June 31
 October 30.

BOOKS RECEIVED FOR REVIEW

- The Endocrine Glands* Max A. Goldzicher 916 pp. New York and London D. Appleton-Century Co., Inc. 1939 \$10.00.
A Textbook of Pathology W. G. MacCallum. Seventh edition. 1302 pp. Philadelphia and London W. B. Saunders Co., 1940 \$10.00.
Clinical Heart Disease Samuel A. Levine. Second edition. 495 pp. Philadelphia and London W. B. Saunders Co., 1940 \$6.00.
The Individual and His Society: The psychodynamics of primitive social organization Abram Kardiner 503 pp. New York Columbia University Press, 1939 \$3.50.
Your Marriage: A guide to happiness Norman E. Himes. 434 pp. New York and Toronto Farrar & Rinehart, Inc., 1940 \$3.75.
Dental Roentgenology LeRoy M. Ennis. Third edition. 398 pp. Philadelphia Lea & Febiger 1939 \$6.50.
Chemistry and Medicine: Papers presented at the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota. Edited by Maurice B. Visscher 296 pp. Minneapolis University of Minnesota Press, 1940 \$4.50.
An Anatomical Analysis of Sports Gertrude Hawley 191 pp. New York A. S. Barnes & Co., 1940 \$3.00.
Physiological Optics W. D. Zoethout. Third edition. 406 pp. Chicago Professional Press, Inc., 1939 \$5.00.
Periodontal Diseases: Diagnosis and treatment. Arthur H. Merritt. Second edition. 205 pp. New York Macmillan Co., 1939 \$3.50.
The Vasomotor System in Anoxia and Asphyxia Ernst Gellhorn and Edward H. Lambert 70 pp. Urbana Illinois University of Illinois Press, 1939 \$1.00.
An Index of Treatment. By various writers. Edited by Robert Hutchison. Twelfth edition. 996 pp. Baltimore Williams & Wilkins Co., 1940 \$12.00.
An Atlas of the Commoner Skin Diseases Henry C. G. Semon. Second edition. 272 pp. Baltimore Williams & Wilkins Co., 1940. \$12.00.
Cyclopropane Anesthesia. Benjamin H. Robbins. 175 pp. Baltimore Williams & Wilkins Co., 1940. \$3.00.
Asthma and the General Practitioner James Adam. 157 pp. Baltimore Williams & Wilkins Co., 1939 \$2.00.
Psychiatry for Nurses Louis J. Karnosh and Edith B. Gage. 327 pp. St. Louis C. V. Mosby Co., 1940. \$2.75.
A Synopsis of Surgery Ernest W. H. Groves. Eleventh edition. 714 pp. Baltimore. Williams & Wilkins Co., 1940 \$5.00.
Population: A problem for democracy The Godkin Lectures, 1938. Gunnar Myrdal. 237 pp. Cambridge Harvard University Press, 1940 \$2.00.

Modern Medical Therapy in General Practice Edited by David P. Barr 3 vol. 3661 pp. Baltimore Williams & Wilkins Co., 1940. \$35.00.

The Way Life Begins: An introduction to sex education Bertha C. Cady and Vernon M. Cady 80 pp. New York American Social Hygiene Association, 1939 \$1.50 50c paper cover.

Digest of Laws and Regulations Relating to the prevention and control of syphilis and gonorrhea in the forty-eight states and the District of Columbia Compiled under the direction of Bascom Johnson. 438 pp. New York American Social Hygiene Association 1940. \$5.00.

Sulfanilamide Sulfapyridine and Allied Compounds in Infections Maurice A. Schmutz. Edited by Henry A. Christian. 72 pp. New York, London and Toronto Oxford University Press, 1940. \$1.50.

Operative Surgery J. Shelton Horsley and Isaac A. Bigger. Fifth edition. 2 vol. 1567 pp. St. Louis C. V. Mosby Co. 1940. \$18.00.

Doctors in Shirt Sleeves: Musings on hobbies, nials, patients, sport and philosophy Edited by Henry Bashford. 294 pp. New York Veritas Press, 1940 \$2.50.

Pediatrics and Pediatric Nursing A. Graeme Mitchell, Echo K. Upham and Elgie M. Wallinger 575 pp. Philadelphia and London W. B. Saunders Co., 1939 \$3.00.

Trends in Nursing History: Their relationship to world events Elizabeth M. Jamieson and Mary Sewall. 570 pp. Philadelphia and London W. B. Saunders Co., 1940. \$3.00.

BOOK REVIEWS

The Electrocardiogram and X-Ray Configuration of the Heart Arthur M. Master 222 pp. Philadelphia Lea & Febiger 1939 \$6.50.

Dr. Master has composed an atlas of electrocardiograms and x-ray pictures of the heart for beginners who have had their fundamental grounding in technique and principles. The volume may prove helpful even to those more skilled in cardiology since there are a number of points that the author emphasizes which are not kept constantly in mind or concerning which there have been advances. For example he calls attention to the fact that in a case of valvular heart disease the presence of high voltage without axis deviation usually indicates both left and right ventricular enlargement.

He explains the purpose of the book in the first two paragraphs of the preface as follows:

Excluding arrhythmias, electrocardiography may be divided into two parts, the changes associated with muscle damage, acute or chronic, and those related to the configuration of the cardiac chambers. Examples of the first group are rheumatic carditis, myocardial infarction and fibrosis, lobar pneumonia, typhoid fever, and acute nephritis. The second group includes factors such as age, body position, habitus, obesity, pregnancy, hypertension, valvular disease, congenital heart disease, pulmonary disease and deformities of the chest which alter the contour of the heart. The significance of the second group has been largely neglected, and this monograph has been written in the effort to correct this, since an appreciation of the dependence of the electrocardiogram on the size, shape and position of the heart is absolutely fundamental in the interpretation of the electrocardiogram.

The need for such a book is indicated particularly at the present time, since electrocardiographic instruments are now obtainable at quite low prices and the

technique of taking the record has become very simple. As a result a large number of physicians are now taking and interpreting electrocardiograms without the study and application necessary for doing this properly.

The contents include, after a short introduction, a brief statement about the normal electrocardiogram. Illustrations follow showing the effect of age on the contour and size of the heart and on the electrocardiogram, beginning with the newborn and proceeding to extreme old age. Next there is an important section on the effect of change with body position and respiration, and the relation of the x-ray plate and electrocardiogram to body habitus. These illustrations are perhaps the most important in the book for they are most often wrongly interpreted. There follows a discussion of axis deviation and ventricular preponderance, first of the left side of the heart secondary to hypertension and aortic valvular disease, and second of the right side of the heart secondary, chiefly, to mitral stenosis. There is a presentation of the effect of combined valvular disease of the heart and of symmetrical enlargement due to other causes, and a section on congenital heart disease. The last five sections deal with auricular enlargement, Graves's disease, pericardial effusion, pulmonary disease (with the acute and chronic cor pulmonale) and deformities of the chest.

The most difficult part of the book and that section which is the least well presented concerns congenital heart disease. One may raise a question about the interpretation of several of the cases, particularly Cases 51, 53 and 56. One also misses in the discussion of thyroid disease the characteristic x-ray picture and electrocardiogram of well marked myxedema. One may question the statement on page 96 that a slurring of the QRS group indicates myocardial involvement. Such slight slurring as is shown is consistent with marked enlargement of the heart, which may also account for increase in the width of QRS waves without the need of interpreting bundle branch block. This latter point Dr. Master emphasizes, on page 108, as an important and relatively new point of view, which he states that he will present in a further publication. The statement on page 160 that, in the case of the tetralogy of Fallot, right axis deviation is the result of the large right ventricle, whereas the increased amplitude of the QRS complex is probably caused by the enlarged left ventricle, is open to question, since in such cases the left ventricle is not enlarged and the increased amplitude of the QRS complexes is quite adequately explained by the very large right ventricle. There are two or three minor errors: on pages 28 and 29 left ventricular hypertrophy might be better expressed as left ventricular preponderance since the heart itself is stated to be normal, and on page 181 the word "restored" in the legend should be "absorbed."

One of the interesting aspects of the book is the inclusion of brief historical references. In the discussion of large P waves one might add on page 171 Samoiloff's name, since he contributed an important paper in 1909 on the large P waves of mitral stenosis.

There are two figures that are especially instructive in showing the evolution of the electrocardiogram. Figure 31, which shows the development of the hypertensive electrocardiogram, and Figure 38, which shows the development in both the electrocardiogram and roentgenogram of progressive enlargement of the left ventricle secondary to syphilitic aortic insufficiency.

The text of the book is clear and simple. The illustrations are clear cut and well arranged. The reviewer was at first disturbed by the fact that some of the

x-ray pictures were in different positions, even upside down, but such pictures were so arranged to indicate the position in which the person was lying at the time, showing the effect of change in position.

The plan of this book is novel and brings together more extensively than has been done before the combination of roentgenographic and electrocardiographic patterns in structural defects of the heart.

A Symposium on Cancer Given at an Institute on Cancer Conducted by the Medical School of the University of Wisconsin. 202 pp. Madison: University of Wisconsin Press, 1938. \$3.00.

This group of addresses given at the Institute on Cancer conducted by the Medical School of the University of Wisconsin in 1936 gives a considerable amount of interesting information. The material presented was new and of interest at that time, but the field has naturally progressed considerably in the past three and a half years.

There are two articles on experimental tumor production by Kreyberg, an excellent review of the value of tissue cultures in the study of cancer by Lewis and addresses on a number of other fields of cancer research that are sound but somewhat ephemeral in their interest. There would be some disagreement with Macklin's interpretation of the familial incidence of cancer. Likewise, some would question Coutard's estimate that 15 to 20 per cent of all breast cancers are extremely radio-sensitive.

A Mirror for Surgeons: Selected readings in surgery D'Arcy Power. 230 pp. Boston: Little, Brown & Co., 1939. \$2.00.

By training, temperament and experience, Sir D'Arcy Power—the dean of the British surgical profession, so referred to by Dr. Francis R. Packard, who writes the "Introduction"—is peculiarly qualified to present to the medical profession essays containing brief biographical notes and extracts from some of the writings of twenty-two surgeons. Perhaps the most satisfying compensation offered to the reader by these selected readings in surgery is the opportunity of following the evolution of surgical thinking, beginning with the quaint English of John Arderne in the fourteenth century. The surgeons considered are as follows: Thomas Gale, Ambrose Paré, John Halle, William Clowes, Maister Peter Lowe, John Woodall, Richard Wiseman, William Cheselden, Percival Pott, John Hunter, Abraham Colles, Sir Charles Bell, John Collins Warren, Sir Benjamin Collins Brodie, Sir James Paget, Lord Lister, Sir Jonathan Hutchinson, Sir William Macewen, William Stewart Halsted, Henry Jacob Bigelow and James Marion Sims. This book will find good service in all libraries.

Caesarean Section: Lower segment operation C. McIntosh Marshall. 230 pp. Baltimore: William Wood & Co., 1939. \$6.50.

This book is an interesting, careful monograph on the low segment method of cesarean section. It is well illustrated and clearly written, and there is an excellent bibliography after each chapter pertaining to the various parts of the operation. The author, however, has written nothing about postoperative treatment, a detail which, to the reviewer, is very necessary and important.

In the book sent for review there is an error in binding which, if it holds throughout the entire edition, is a very serious defect. The price of the book seems a little out of proportion to its value.

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EXCESSIVE ACETYLTATION OF SULFANILAMIDE IN ADVANCED RENAL DISEASE*

Report of a Case

J GARROTT ALLEN, M.D.†

CHICAGO

MARSHALL, Emerson and Cutting¹ have shown in the human subject that more than 90 per cent of the quantity of sulfanilamide ingested is excreted by the kidneys. Stewart, Rourke and Allen² demonstrated that this drug is rapidly cleared from the blood stream in a manner similar to that of urea. From these two studies the clinical inference has been made that sulfanilamide should be used with caution in cases of impaired renal function. However, careful observations have not been made on human subjects concerning the excretion of this drug in cases of severe renal disease.

It is the purpose of this paper to report a case of duodenal ulcer with advanced renal disease in which sulfanilamide was given in the treatment of a wound infection. In this patient the blood concentration of both the free and the conjugated forms of sulfanilamide rapidly became excessive, although the quantity given was well within the limits of present usage. The accumulation of excessive acetylsulfanilamide has been reported in the nephrectomized rabbit.³ This phenomenon has not been reported in man. Since the acetylated portion of sulfanilamide is many times more toxic than the free form, it is possible that the excess of acetylsulfanilamide which occurred in this patient was a contributory cause of death.

CASE REPORT

A 59-year-old white, married bookkeeper was admitted to the University of Chicago Clinics on December 12, 1938 complaining of epigastric distress and vomiting following meals.

In 1935 an ulcer in the first portion of the duodenum had been demonstrated by fluoroscopic examination. The patient was at that time placed on careful ulcer manage-

ment including powders, but in spite of this regime the ulcer symptoms continued and between August, 1937 and May 1938 he experienced three bouts of hematemesis. About 2 months prior to admission symptoms of pyloric obstruction first appeared, and this diagnosis was confirmed by x-ray examination on admission.

For 7 years preceding 1937 the patient experienced increasing symptoms of urinary obstruction from benign prostatic hypertrophy. A transurethral electroresection was done on June 24, 1937 and relief of symptoms was obtained, although mild urinary frequency persisted. The nonprotein nitrogen at the time of operation was normal but the urine was heavily infected with colon bacilli. The postoperative course was otherwise uneventful.

On admission to the University Clinics a gastroenterostomy for relief of pyloric obstruction was advised. However because of moderate alkalosis and a severe reduction of urea clearance (Table I) surgery was delayed and the

TABLE I
Urea Clearance and Acid-Base Studies of Blood from the Time of Admission until That of Death

| HOSPITAL DAY | BLOOD UREA NITROGEN mg. per 100 | Urea CLF. AS G. G. | BLOOD CHLORIDE milli mol. / l. | BLOOD CA. 30% DROPS milli mol. / l. | BLOOD REACTION pH |
|--------------|------------------------------------|--------------------|-----------------------------------|--|----------------------|
| 1 | 40.7 53.6 | 11 | 94.0 | 30.7 | — |
| 7 | 45.2 | 8 | 72.0 | 45.0 | .62 |
| 11 | 45.5 | — | 66.0 | 38.1 | .63 |
| 15 | 34.8 | 1 | 97.8 | 32.9 | .53 |
| 18 | — | 17 | 9.0 | — | .62 |
| 28 | — | — | — | — | 7.52 |
| 45 | 17.0 | 17 | 94.8 | 4.0 | 7.47 |
| 57 | 20.4 | 70 | 88.0 | 76.4 | .34 |
| 64 | 27.3 | 18 | 97.6 | 22.8 | .32 |
| 71 | 26.6 | 17 | 98.2 | 20.0 | .38 |
| 3 | 30.0* | — | 96.3 | 16.8 | .40 |
| 4 | 58.0* | — | 96.5 | 16.7 | — |
| 7 | 80.0* | — | — | — | — |

*Total nonprotein litroen.

ulcer powders which the patient had taken continuously for 2 months were discontinued. Sodium chloride in large quantities was given orally and parenterally but the response was slow and minimal. No further significant findings were observed and icterus was never present.

On the 28th hospital day a posterior gastroenterostomy was done. The early postoperative course was uneventful but on the 34th day a superficial wound abscess was found

From the Department of Surgery, University of Chicago. This work was aided by a grant from the Douglas Smith Foundation for Medical Research.

†Research assistant, Douglas Smith Foundation, Chicago.

and drained. A mild elevation of temperature developed on the 39th day and continued through the 46th day. The patient was then afebrile until the 57th day, when temperature elevations to between 99.0 and 103.0°F gradually developed, although no satisfactory explanation for this fever was found. Blood cultures on the 43rd, 46th, 70th and 71st days showed no bacterial growth, and agglutination tests for typhoid, paratyphoid A and B and undulant fever bacilli and infectious mononucleosis were negative. The white-blood-cell count slowly rose to 20,000 by the 69th day.

Beginning on the 70th hospital day, sulfanilamide was given in doses of 15 gr (10 gm) every 4 hours for 3 days, making a total of 255 gr (165 gm.) On the morning of the 73rd day the patient was somewhat stuporous, so sulfanilamide was discontinued. Blood was drawn for chemical studies and a free sulfanilamide blood level of 28 mg per 100 cc. was noted (Table 2). On the 74th day

TABLE 2 *Conjugated and Free Sulfanilamide in the Blood and Urine from Time of Discontinuance of the Drug until Death*

| POSTOPERATIVE DAY | BLOOD SULFANILAMIDE | | URINE SULFANILAMIDE | | FLUID INTAKE cc | URINE VOLUME cc |
|-------------------|---------------------|---------------|---------------------|---------------|-----------------|-----------------|
| | FREE | TOTAL | FREE | TOTAL | | |
| | mg per 100 cc | mg per 100 cc | mg per 100 cc | mg per 100 cc | | |
| 73 | 28.0 | — | — | — | — | — |
| 74 | 19.8 | 37.8 | 41.7 | 312.0 | 3500 | 1200 |
| 75 | 8.6 | 29.0 | 41.5 | 147.0 | 6200 | 2175 |
| 76 | — | — | 20.0 | 116.0 | 4500 | 500 |
| 77 | 1.2 | 14.1 | 0.0 | 0.0 | 3000 | 0 |

the free blood sulfanilamide was 19.8 mg per 100 cc., while the total, including the combined form, was 37.8 mg. Both forms slowly fell, and on the 77th hospital day the acetylsulfanilamide blood level was 12.9 mg per 100 cc., while the free level was only 1.2 mg, resulting in a total of 14.1 mg. The blood chlorides, calcium, phosphorus and nonprotein nitrogen were normal, although the blood carbon-dioxide content was slightly reduced. Complete urinary collections were begun on the 74th hospital day by means of an indwelling catheter, and daily samples were analyzed for their sulfanilamide content (Table 2). Large amounts of fluids were given parenterally in hope of producing a diuresis to facilitate sulfanilamide excretion. However, the patient's urinary volume gradually decreased, and he became anuric during the last 18 hours of life. He died on the 77th hospital day in respiratory failure.

At autopsy the recent midline abdominal scar contained the opening of a small sinus in its upper third, from which about five drops of pus were expressed. This sinus ended blindly in a mass of scar tissue on the anterior surface of the duodenum. There were numerous adhesions in the abdominal cavity between the liver, the stomach, the duodenum and the anterior abdominal wall, although no free fluid or abscesses were found. The stoma of the gastro-enterostomy was patent and competent. The ulcer on the posterior wall of the duodenum gave evidence of healing, there were no signs of recent bleeding or perforation, although a high grade of stenosis was present in the first portion of the duodenum. The kidneys were small and pale, their combined weight being 165 gm. Their capsules stripped with ease from smooth, pale surfaces. The cortical markings were obscure. The pelvic fat was increased, and each renal pelvis was dilated and thick-walled. The calyces were large and clubbed at their ends. The urinary bladder was contracted and thick-walled, and the prostate was small. Except for several small areas of consolidation at the right base the lungs and heart were normal. One

of the three parathyroid glands found was definitely enlarged. There were numerous areas of fibrocystic disease in the skeleton. The microscopic studies added little. In the kidneys there was destruction of most of the tubules and many of the glomeruli, with deposits of calcium in some of the tubules, and from the gross and microscopic findings the diagnosis of a chronic ascending nephritis was made. The evidence of hyperplasia of one of the parathyroid glands was confirmed by microscopic section.

DISCUSSION

Since the excretion of sulfanilamide by the kidneys is quite similar to the excretion of urea, it is presumable that any renal damage sufficient to impair the clearance of urea might also effect the clearance of sulfanilamide. Furthermore, as the kidneys represent the sole important channel of escape of this drug, any delay in the renal excretion of sulfanilamide would allow it to accumulate in the blood stream. In the case presented here a severe reduction of urea clearance had been demonstrated (Table 1), and this functional impairment is attributed to a chronic ascending nephritis, plus the effect on the kidneys of a prolonged period of alkalosis. Under these conditions a high grade of retention of sulfanilamide resulted, which in turn gave rise to excessive blood concentrations of this drug. Such a high sulfanilamide blood level may also be produced by giving excessive quantities of the drug, but in this case, since the dose did not exceed present practice, all evidence points toward delayed excretion as the cause of this abnormally high concentration.

It is very interesting to note that most of the sulfanilamide retained was rapidly conjugated into the acetyl form at the expense of the free sulfanilamide, which practically disappeared from the circulating blood. Twenty-four hours after the drug was discontinued a total blood level of 37.8 mg per 100 cc was present, and of this quantity 18 mg, or 47 per cent of all the circulating sulfanilamide, was conjugated. This percentage slowly increased until twelve hours before death, when more than 90 per cent of the remaining drug was in acetyl form. There was, of course, a slow quantitative decline commensurate with the retarded renal loss. Such a high percentage of the drug appearing in the conjugated form is not ordinarily seen in patients receiving sulfanilamide. However, Stewart, Rourke and Allen³ have reported a similar, abnormally high percentage of acetylsulfanilamide in the rabbit when excretion of the drug was prevented by nephrectomy. In this animal the site of conjugation is in the liver. These workers showed that the process of acetylation, which continues at a relatively constant rate in the nephrectomized rabbit, gradually results in the

complete acetylation of a given amount of sulfanilamide in two or three days. Consequently, the unusually high percentage of acetylsulfanilamide present in the case here discussed suggests that in the human subject conjugation also progresses at a relatively fixed rate unrelated to renal function, and that when a given amount of sulfanilamide is retained in the circulatory blood for a period of time longer than normal, a greater proportion of drug becomes acetylated.

The significance of acetylsulfanilamide in man is not clearly understood. However, Marshall, Cutung and Emerson⁴ produced severe toxic symptoms in the rabbit when the acetyl form exceeded 7 to 9 mg per 100 cc., but untoward symptoms were not manifested when free sulfanilamide was given until a blood concentration of more than 40 mg was obtained. These workers suggest that many of the gastrointestinal and cerebral symptoms occurring in man may be associated with an increased amount of circulating acetylsulfanilamide. Therefore, in cases of renal disease where delayed excretion may lead to excessive quantities of conjugated sulfanilamide, the toxicity of the drug may be considerably increased, so that until further clinical knowledge is available sulfanilamide should be used with great caution in cases

in which delayed excretion of the drug may occur. In this case it was impossible to assign a cause of death. Since the brain was not examined, death from cerebrospinal disease cannot be excluded, but the presence of such large amounts of free sulfanilamide and acetylsulfanilamide in the blood stream may have been contributory in the cause of death.

SUMMARY

A case of duodenal ulcer and unexplained fever with severe renal disease is presented in which excessive blood levels of free sulfanilamide and acetylsulfanilamide were obtained although the quantity of the drug given was not excessive.

The abnormally high percentage of acetylsulfanilamide and its association with delayed excretion of the drug are discussed.

The importance of cautious administration of sulfanilamide to patients with renal disease is emphasized.

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THE USE OF CIRCULATION TIME DETERMINATIONS IN THE DIAGNOSIS OF VENOUS-ARTERIAL SHUNTS*

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IN THE study and diagnosis of heart disease the determination of circulation time may be a definite aid to the clinician and in some cases, as we shall point out later, may be as valuable as the stethoscope, sphygmomanometer, roentgenogram or electrocardiogram.

Normally the arm-to-lung circulation time that is, the time needed for the blood to travel from the antecubital vein through the right side of the heart to the lungs, is four to eight seconds¹⁻⁴. The arm-to-tongue time is ten to sixteen seconds^{1, 5, 6, 7}. In this interval the blood travels to the lungs as previously, but in addition must return to the left side of the heart and finally go to the taste buds of the tongue.

Hemodynamic changes in cardiac disease fre-

quently affect the velocity of blood flow, which in turn results in abnormal circulation-time determinations. Cardiac disease may cause a prolongation of circulation time (decrease in blood velocity) an acceleration of circulation time (increase in blood velocity) or no change.

Circulation time determinations have been found useful in studying the hemodynamics of early congestive heart failure.⁸ Blumgart and Weiss⁹⁻¹¹ have shown that a prolonged circulation time frequently precedes the clinical signs of cardiac failure such as edema, rales in the lungs, cyanosis and distended veins. Although congestive heart failure is the most frequent cause of prolonged circulation time this finding has also been noted in idiopathic and secondary polycythemia, and in hypothyroid states and other conditions causing a decrease in body metabolism.¹²

The diagnosis of heart disease produced by avitaminosis B₁ is facilitated by the presence of an

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accelerated circulation time¹³ An accelerated circulation time is also found in anemia, hyperpyrexia¹⁴ and cardiac conditions associated with hyperthyroidism^{12 15}

Another clinical use of circulation time is in differentiating cardiac and noncardiac conditions, as, for example, in distinguishing between cardiac and bronchial asthma In the former the circulation time is prolonged, while in the latter it is normal Still another possible application of these tests is to demonstrate certain cardiac malformations, congenital or acquired, and it is this use that we shall discuss more fully

In a venous-arterial shunt there is a direct mixing of unoxygenated or venous blood with oxygenated or arterial blood Clinical examples of this condition are seen in congenital or acquired interventricular septal defects with right-sided cardiac hypertrophy, three-chambered hearts, transposition of the aorta, anomalies of blood vessels and so forth In these cases the patient is cyanotic at all times

The arm-to-lung circulation time in a venous-arterial shunt is normal, since the blood goes on its regular route from the arm to the right side of the heart and to the lungs The arm-to-tongue time, however, is lessened, because a certain percentage of blood, after traveling from the arm to the right side of the heart, is shunted to the left side through the existing anomaly or defect, avoiding the pulmonary circulation entirely and continuing on to the tongue The pulmonary circulation is short-circuited in this course, thus reducing the duration of arm-to-tongue time Since the time needed for the blood to travel from the arm to the right side of the heart and to the lungs (arm-to-lung time) is about the same as the time needed to travel from the arm to the right side of the heart, to the left side (through defect) and to the tongue (arm-to-tongue time), one should find the two times about the same in a case of venous-arterial shunt

With this principle in mind, as first pointed out by Benenson and Hitzig¹⁶ at Mt Sinai Hospital in New York City, circulation-time determinations were performed in the following case, one of tetralogy of Fallot—interventricular septal defect, pulmonary artery stenosis, right ventricular enlargement and transposition of the great vessels as they emerge from the heart

CASE REPORT

R. M., a 19-year-old Italian born white girl, was admitted to the Boston City Hospital on January 17, 1939, complaining of fatigue of many years' duration and of a generalized cyanosis, especially marked on the face and extremities

In November, 1938, she had been on another service of the hospital for the same complaints

Eleven years previously the patient had been told that she had "rheumatic heart disease." The chief complaints at that time were weakness, fatigue and failure to gain weight, and these symptoms had continued to the present, associated with occasional palpitation of the heart. She was always up and around, however, except for the year previous to entry, when her fatigue became so marked that she voluntarily stayed in bed When the fatigue was most marked the persistent cyanosis became more intense and the extremities felt cold The patient had moderate dyspnea on exertion and was more comfortable in the upright position. Nocturia—two or three times—had been present during the month previous to admission, and the menses, which had started at the age of fourteen, were scant and irregular There was no history of joint, muscle or chest pain, sore throat, chorea, fever, night sweats, epistaxis or edema

Physical examination revealed a poorly nourished, under developed white girl, moderately fatigued and orthopneic but not acutely ill The skin was bluish scarlet, especially over the nose, cheeks and extremities The head, neck and lungs were normal The chest wall had a moderate *Trichterbrust* deformity The apex beat of the heart was sharply felt in the fifth interspace, 7.5 cm from the mid-sternal line. The rate was 130 per minute and regular A systolic thrill was palpable over the pulmonic area. A loud, harsh systolic murmur was heard over the third and fourth interspaces to the left of the sternum, and was transmitted toward the left axilla The second pulmonic sound was markedly accentuated The extremities were cyanotic, felt very cold and showed clubbing of the fingers and toes The remainder of the examination was normal.

The red blood-cell count varied between 7,210,000 and 8,890,000, and the hemoglobin between 20.0 and 25.4 gm. (Sahli) per 100 cc. The white-cell count was 16,900 with 76 per cent polymorphonuclear leukocytes and 24 per cent lymphocytes Several specimens of urine were negative except for an occasional white cell per high power field. Repeated stool examinations were negative for occult blood. A blood Hinton test was negative. The blood pressure was 118/88 in both arms Electrocardiographic tracings showed a right axis deviation at all times, and 7 foot roentgenograms of the heart revealed a constant accentuation of the pulmonary conus

The arm-to-lung circulation time (normal, 4 to 8 seconds) was determined by the use of 5 minims of ether diluted with an equal amount of physiological saline solution, the time being recorded from the injection of the ether to the moment the patient smelled it. Paraldehyde in similar dosage and dilution was also used for measuring the arm-to-lung time. The ether times were 8.1 and 8.2 seconds, while the paraldehyde times were 8.1 and 8.6 seconds. No systemic vascular reaction was experienced.

Arm-to-tongue circulation time (normal, 8 to 16 seconds) was determined by the injection of 5 cc. of Decholin (dehydrocholic acid) solution, and also of 5 cc. of calcium gluconate solution The patient indicated the moment she tasted the substances The calcium gluconate times were 8.4 and 9.2 seconds, and both Decholin times were 8.0 seconds

Each determination of arm-to-lung and arm-to-tongue time was repeated at least four times, and reasonable checks were obtained Interspersed among the actual tests, physiological saline solution alone was injected intravenously on two occasions, the patient being requested to indicate the end point, no taste or smell sensations were noted.

Observations were made on various days. On all occasions the patient was co-operative, alert and intelligent making us feel confident in the results.

The arm-to-lung and arm-to-tongue circulation times were practically identical the respective averages being 8.3 and 8.4 seconds. We believe this similarity in results to be due to a functioning venous-arterial connection as discussed earlier in this paper. The arm-to-lung circulation time determinations of 8.1 to 8.6 seconds are slightly above the accepted normal upper limit of 8 seconds. This finding is readily explained by the secondary polycythemia present in this case.

Benenson and Hitzig's¹⁶ results in 2 cases of tetralogy of Fallot, with ether and saccharin as test agents, were similar to ours. In one case the arm-to-lung time was 11.0 seconds, and the arm-to-tongue time 11.8 seconds, in the other case the times were 7.5 seconds and 3 to 4 seconds respectively. McGuire and Goldman¹⁷ observed accelerated arm-to-carotid sinus times (3.8-4.8 and 4.0 seconds respectively) with the use of sodium cyanide in 3 cases of tetralogy of Fallot but they did not make arm-to-lung time determinations. Several conditions may cause an accelerated arm-to-tongue (or arm-to-carotid sinus) circulation time. The diagnostic value of circulation time determinations does not lie in any change in arm-to-lung or arm-to-tongue time, but in the finding of similarity between them.

SUMMARY

Circulation time studies were performed in a case of venous-arterial shunt (tetralogy of Fallot)

The arm-to-lung and arm-to-tongue circulation times were found to be similar.

This result can be utilized to establish the diagnosis of venous-arterial shunt.

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CLINICAL NOTE

PNEUMOPERITONEUM DUE TO PERFORATION OF THE TRANSVERSE COLON IN AN UMBILICAL HERNIA

Report of a Case

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PNEMOPERITONEUM from perforation of an ulcer of the intestinal tract, particularly in

in industry where the bowel is forcefully distended with air via the rectum¹⁻³ Examination of the literature, however, reveals no report of pneumoperitoneum from causes as presented in the following case, and it would therefore seem of interest to report this case in some detail

CASE REPORT

The patient, R. M., was a 69 year-old German housewife. Her past history was irrelevant. She had always been healthy until 1 hour before being seen, when she had a sudden chill with pain in the right upper quadrant of the abdomen, associated with nausea and marked cyanosis.



FIGURE 1

the duodenum, is not uncommon. This same condition has also been reported from traumatic rupture of the bowel from the use of compressed air

She complained of severe general abdominal pain and difficulty in breathing. She looked extremely sick. There was deep cyanosis. The abdomen was markedly distended and tender throughout, with the maximum point of tenderness in the right lower quadrant. There was an umbilical hernia about 7 cm. in diameter which contained

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no viscera but free gas which could be readily expressed. There was complete obliteration of liver dullness. The pulse was 96 regular and of good quality the blood pressure was 112/80. The patient was sent at once to the hospital, where Wangenstein drainage of the stomach was instituted, without relief of the distention. X-ray films of the lower thorax and abdomen taken with the patient semi-upright showed marked elevation of both leaves of the diaphragm due to a pneumoperitoneum there was a single tremendously dilated loop of large bowel in the right flank (Fig 1).

Under novocain infiltration and cyclopropane anesthesia a laparotomy was performed through a right rectus muscle splitting incision. When the peritoneum was opened a large amount of foul-smelling gas escaped with immediate decompression of the abdominal wall. The cecum was tremendously dilated, but no perforation was found at this point. No bowel was protruding into the umbilical hernia. There was diffuse peritonitis along the course of the cecum and ascending colon but no fecal matter was found free in the peritoneal cavity. The incision was extended upward and an area of necrosis was found in the transverse colon about 3 cm. in diameter lying 3 cm. medial to the hepatic flexure. The bowel was not strangulated but there was a minute perforation in the middle of the necrotic area. The hepatic flexure was freed so that the necrotic area of bowel could be exteriorized, suturing the bowel

together as in a Mikulicz type of operation. A Mixer tube was then inserted at the site of perforation. No effort was made to drain the abdominal cavity.

The patient had two chills on the 1st and 2nd days following operation with a fall in temperature to normal on the 7th day. The colostomy opening drained well. The Mixer tube sloughed out spontaneously in 5 days. Clamps were applied on the 12th day after operation. Phlebitis developed in the right leg but subsided in 10 days. Three weeks after the operation the patient was having excellent bowel movements by rectum and there was very little drainage from the operative site. Shortly after this a polyp protruded from the rectum with each defecation. This was removed 5 weeks after the first operation. The patient made an entirely uneventful convalescence from this operation and was discharged 69 days after entry at which time the colostomy opening was almost entirely healed.

Three months after discharge the patient died at home from a cerebral hemorrhage. No autopsy could be obtained.

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REPORT ON MEDICAL PROGRESS

DIAGNOSTIC ROENTGENOLOGY

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IN THE progress report¹ of last year emphasis was laid upon a description of the general trends which have characterized the development of diagnostic roentgenology in recent years. This year a few specific diagnostic problems have been selected for discussion, the choice being based in part on the fact that the articles in question have described something new, in part on the opinion of the reviewer that the particular subject has enough everyday importance to warrant the discussion of its present status.

ROENTGEN EXAMINATION IN PATIENTS WITH ILEUS

Recent developments in the diagnosis and treatment of ileus have influenced the work of roentgenological departments.

Roentgenology has been used for many years as an aid in establishing the diagnosis, localization and progress of the disease process in patients with ileus. Case² was one of the first to emphasize

the importance of the flat (scout) film of the abdomen for these purposes. Such films have become a routine procedure, since they represent "the most important single objective finding in the patient with small-bowel obstruction"³ in particular, and of any kind of ileus in general. They usually establish the diagnosis of ileus, positive findings being more conclusive than negative ones. If there is obstruction in the colon such films often allow a differentiation from paralytic ileus whereas the distinction between mechanical and paralytic ileus is usually not possible in cases of obstruction within the small bowel or at the ileocecal valve. Not infrequently a localization of the point of obstruction is possible especially in the colon. A barium-enema examination may be necessary to differentiate a large atonic colon without obstruction from a case of low large-bowel obstruction. In addition it will in most cases define the etiology of the obstruction.

The enthusiasm which has developed for study and treatment of small-bowel disease in the last

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few years has been due to the introduction of the Miller-Abbott tube,⁴ by which the distended loops of small bowel can be deflated and investigated. For many years Wangensteen⁵ has emphasized the importance of deflation in the treatment of ileus, and constant suction through gastric or duodenal tubes has become common practice for this purpose. The Miller-Abbott tube with its two channels—one for suction, the other for the inflation of a balloon close to the end of the tube—has the advantage that it can be introduced into the small intestine, where it is then propelled by peristalsis until it stops at the point of obstruction. The tube was originally used for physiological studies, then for deflation in ileus, later in the localization of obstructive lesions and finally in the demonstration of the obstructing lesion and its character.⁶

Abbott⁷ characterizes the beneficial effects of intubation as follows: emptying of the intestine and restoration of the peristalsis, supplying data for adjustment of the fluid and electrolyte balance of the body, relieving the obstruction itself, identifying the location and nature of the lesion, simplifying the technic of any required surgical procedure, protecting the suture lines after operation, and converting an emergency into an elective surgical procedure.

The application of the tube requires some training and experience, so that disappointment not infrequently attends the first attempts at using it. The necessity of close, patient co-operation between surgeon and roentgenologist is stressed by those experienced in its use.

What is the role of the roentgenologist in this combination? It can be divided into two parts, one before and one after the tube has reached the point of obstruction. The most valuable help the roentgenologist can give in the first part of the examination is in guiding the tube through the pylorus. This is the most difficult part of the procedure. Failures of the method have usually been due to the impossibility of getting the tube into the duodenum, therefore, if possible, this part of the examination should be done under fluoroscopic control. The tube may roll up in the stomach, in which case it should be withdrawn to a proper length. The tip of the tube must be guided toward the pylorus and at times may be massaged into the duodenum. A drink of cold water, as recommended by Holmes, is of advantage in opening the pylorus. After the tube has passed the pylorus and the balloon is inflated, follow-up films may be taken at intervals of twelve to twenty-four hours

with a bedside unit to control the progress of the tube and check the degree of deflation taking place proximal to the balloon.

If the tube is used for deflation only, the main part of the roentgenological examination ends after the tube has stopped progressing and complete deflation has taken place. In other cases it is desirable to use the tube to investigate the area of obstruction. This may be done with a small amount of barium injected into the suction channel of the tube after deflation of the balloon. Several authors have reported good results with this method, which should be done under fluoroscopic control and preferably with the use of spot films.^{8, 9} In paralytic ileus the absence of obstruction can be demonstrated, and in mechanical ileus the exact location and character of the obstructing lesion can be visualized. A differentiation between obstruction due to neoplasm, inflammation or adhesive bands is usually possible.⁹ Lofstrom and Noer⁸ enumerate the advantages of this type of barium examination as follows: only small amounts of barium are necessary, the barium is not diluted by secretions, these having been aspirated, the method is not dangerous, and most of the barium can be aspirated at the end of the examination.

Lofstrom and Noer have also recommended the Miller-Abbott tube for the examination of an isolated loop of small intestine in cases without obstruction. For this purpose the holes in the tube distal to the balloon are omitted, and the balloon instead of being deflated is inflated before the barium is injected. By this "segmental survey," which can be improved by using a tube with three channels and two balloons, any desired degree of barium filling is possible in any part of the small intestine. This is an ideal method of examining this portion of the intestinal tract, and is useful in certain cases. It is time-consuming, and, unless combined with a preceding routine examination which localizes the questionable lesion, not without danger for patient and doctor, owing to the amount of radiation which both may receive.

PREPYLORIC ULCER

The aim of roentgenology, and of gastrointestinal roentgenology in particular, is to demonstrate accurately the gross pathologic appearance of the lesion. By means of careful fluoroscopic studies, palpation, spot films, and profile and relief pictures of the lesion and its surroundings, the appearance of the lesion as it would be seen from the inside of the intestine can usually be well visualized. For this reason the roentgenological diagnosis of cancer of the stomach, particularly

ulcerated cancer, is fairly easy in most cases, just as it is for the pathologist when he inspects the opened specimen

The situation of the roentgenologist is different in those cases in which gross inspection of an ulcerated gastric lesion does not allow the pathologist to differentiate benign and malignant ulcer—lesions in which the microscopic examination determines the final verdict. It is obvious that no macroscopic examination including roentgenograms, will provide a diagnosis in such a case.

A number of authors have stressed the fact that these malignant ulcers (grossly benign but microscopically malignant) are particularly common in the prepyloric region. Several years ago Hampton¹⁰ reviewed the operative and autopsy findings as well as the postoperative follow up on patients with chronic prepyloric ulcerations. The prepyloric region was defined as an area 2.5 cm. long, immediately proximal to but excluding the pylorus. The center of the ulcer was taken as its origin and its distance from the pylorus then determined the classification of the ulcer within or without the group in question. Included in this study were all ulcerations in the prepyloric area which roentgenologically showed evidence of induration, that is, of chronicity, but which failed to show an obvious cancerous growth surrounding the ulceration. In other words, these cases had all the roentgenological criteria which were thought to characterize benign peptic ulcers of the stomach. Eighteen of the ulcerations were found to be cancerous histologically, though many of the lesions appeared benign at the gross inspection of the opened specimen. Only two ulcerations were found in this series which on serial sectioning proved to be benign. Eight additional cases were quoted from the old records of the Massachusetts General Hospital in which the operative findings were thought to indicate a benign prepyloric ulcer, hence a resection was not performed but the follow up later proved the cases to have been carcinomatous in nature. In other words, these studies showed that, excluding the obvious ulcerated prepyloric cancers, it was impossible to decide roentgenologically, or by any other method short of serial histological studies, whether an indurated ulcer in the prepyloric area was benign or malignant, but that the chance of its being malignant was very high.

Using similar but not identical criteria for defining the group of cases, Singleton¹¹ found a higher incidence of benignity, namely, seven benign to four malignant ulcers. He believed that a careful follow up of ulcerations in the prepyloric area would usually allow a roentgenological statement

in regard to benignity or malignancy although he admitted that a malignant ulcer might decrease in size or even disappear under medical treatment.

Another paper on this subject (that of Sampson and Sosman¹²) appeared within the last year and confirmed Hampton's conclusions. Among the cases quoted in this paper one is of particular interest in regard to the necessity of a complete pathological examination. An ulcer in the antrum but not strictly in the prepyloric area had been excised. The anatomical diagnosis was "Chronic gastric ulcer—no evidence of tumor." The patient returned to the hospital six years later with a frank gastric carcinoma. The original specimen being still available, new sections were made which showed the presence of cancer cells similar to those of the tumor removed at the second operation. The authors concluded:

1. Chronic ulcers in the prepyloric inch of the stomach are found to be cancerous in 75 per cent of our cases. It may be necessary to cut many histological sections through the excised ulcer to find the area of carcinoma.

2. These small prepyloric ulcers defy differential diagnosis by all methods of examination except histological and even the pathologists have erred in some of them.

3. Proved cases of prepyloric malignant ulcers are herewith reported: (a) in young persons, (b) with high gastric acidity, (c) with clinical improvement under ulcer therapy, (d) with decrease in the size of the ulcer under alkaline therapy and (e) with roentgen findings simulating benign ulcers.

4. We believe that prepyloric ulcers which do not disappear entirely in a few weeks should be treated by radical resection and even those that disappear should be carefully followed and re-examined periodically.

Studies such as these should not be considered as diagnostic short cuts. They do not relieve the roentgenologist of the necessity of studying a questionable lesion in the prepyloric area with meticulous care. In most cases of cancer, he will be able to recognize grossly the malignant character of the lesion. There remain however those cases of indurated ulceration in which a gross differentiation of benign and malignant ulcer is not possible. Benign ulcers do occur in the prepyloric region but they represent a comparatively small minority. The question of whether or not the rather small risk of a gastric resection is larger than the great risk of neglecting a gastric cancer is a clinical one which has to be answered from case to case.

ROENTGENOLOGICAL EXAMINATION OF THE PLACENTA

In last year's progress report¹ attention was called to a method which demonstrates placenta previa by the increase in the normal distance between the

fetal head and the urinary bladder filled with a contrast substance

Snow and Rosensohn¹³ and Brown and Dippel¹¹ in a confirmatory report have shown that it is possible to visualize the placenta directly. This is particularly true in those cases where it, as usual, does not lie in the pelvis. On good roentgenograms made without the use of any contrast substance the placenta can be seen as a localized bulge in the soft-tissue shadow of the uterine wall. It has a characteristic shape, and is usually clearly differentiated from other tissues by the subcutaneous fat layer of the adjacent fetus. Since the placenta commonly lies on the anterior or the posterior wall of the uterus, a lateral view is usually more successful, though both lateral and anteroposterior views should be taken. The presence of placenta previa can be excluded if the placental shadow is demonstrated in the fundus of the uterus. On the other hand, absence of demonstrable placental shadow is suggestive of placenta previa. This diagnosis may be confirmed by the injection of air into the bladder (Snow and Rosensohn, as well as Brown and Dippel, prefer the injection of 150 cc of air to that of radio-opaque substances, using it as a routine procedure). Placental apoplexy (premature separation), polyhydramnios and extrauterine pregnancy have been diagnosed on the soft-tissue films.

These studies represent a definite advance, especially in the cases of bleeding of unknown origin during pregnancy. Seen from a broader viewpoint, they are another application of soft-tissue roentgenology, a branch of roentgenology still in its infancy.

FATIGUE FRACTURES, WEAR-AND-TEAR FRACTURES, PSEUDOFRACTURES

A number of reports have been published in recent years concerning peculiar "fractures" of various bones, but especially of the tibia. In these cases a thin fracture line may be seen running usually straight across the bone, surrounded by a bandlike zone of increased bone density. The appearance of the dense zone may even precede the demonstration of the fracture line. There is usually local pain and tenderness, but no deformity. A single trauma does not seem to play any role in the history. The appearance of the lesion is very characteristic, inasmuch as it is usually seen in very definite regions. For example, in the tibia it occurs at the junction of the proximal and second quarters of the bone. Roberts and Vogt,¹⁵ who published a report of 12 cases observed in the tibia, described the characteristic clinical course and the roentgenological appearance of the lesions. They believe that the exact nature of the condition is

not known, but conjecture that it may possibly be due to chronic infection, perhaps influenced by the course of nutrient vessels, rather than to fracture.

These "fractures" are not confined to children. Reports from Finland and Germany¹⁶⁻¹⁸ indicate that they are not rare in soldiers, in whom the clinical picture is similar to that seen in children. These authors conclude that the lesion represents a chronic fracture, produced by repeated stress bearing upon the same spot in unprepared, untrained and possibly deficient bone. They compare such fractures to the fatigue breaks which occur in metal as a result of constant vibration or repeated bending back and forth.

These lesions are believed to represent only a special type within a large group of similar fractures, of which the so-called "march fracture" of the metatarsals is the commonest and best-known example. Other less common sites are the fibular shaft, the femoral neck, the medial portion of the upper femoral shaft, the inferior ramus of the pubic bone and the os calcis. Fracture of the first rib occurring in untrained persons who are forced to carry heavy loads on their shoulders has been explained on a similar basis.¹⁹ The so-called "navvy's" or shoveler's fracture,²⁰ a peculiar type involving the tips of the first dorsal and seventh cervical vertebrae, which occurs in poorly trained persons compelled to do hard labor, especially with pick and shovel, is thought to be due to the chronic trauma of constant muscle pull. In keeping with this explanation, the first symptoms in most cases do not appear until several weeks of hard labor have elapsed, indicating that repeated rather than single trauma is causatively concerned.

Fine fracture lines which occasionally occur in great numbers in a bone with Paget's disease, as well as transverse lines of decreased density in osteomalacic bones, are thought to be due to a similar mechanism. In these cases the diseased bone is not adequate for the stress of normal activity.¹⁷

All these processes are obviously of great theoretical interest, but their recognition is also of practical moment in regard to proper diagnosis, prognosis and treatment. In this connection I have seen a case of chronic fracture of the tibia with marked bone condensation in an adolescent in whom the diagnosis of Ewing's tumor was erroneously made and amputation advised.

SCREEN PHOTOGRAPHY

The idea of obtaining roentgenograms by using an ordinary camera to photograph the image on

the fluoroscopic screen goes back to the years immediately following Roentgen's discovery. Caldwell, among others, spent considerable effort on developing this method, but not until marked improvements had been made in the construction of fluoroscopic screens, x-ray tubes, photographic lenses and films did it attain any practical importance.

Advantages which the photographing of the fluoroscopic screen image offers in comparison to large-film radiography are several. On account of its smaller size the photographic film is less expensive. It is also more convenient if a large number of films of various persons are to be taken in rapid succession. The storage of such films is easier and less expensive than that of the usual sized roentgenograms. In other words, there would be a large field for screen photography provided the quality of the pictures were comparable to that of routine direct roentgenograms.

The principle of the apparatus used by the various investigators is similar. A small photographic camera, usually of the Leica type is firmly attached to the fluoroscopic screen at a certain distance. Most authors use a film 24 by 36 mm in size while a few use larger sizes (75 by 75 mm or 4 by 5 in.) An f1.5 lens is used in most cases.

The advantages of screen photography are particularly obvious in the routine serial examination of large groups, such as students, employees, soldiers, tuberculous suspects and so forth. De Abreu²² in Brazil, was the first to use this method for such purposes. Janker²³ deserves credit for several technical developments. The enthusiasm of these men and others has stimulated the extensive use and development of this method for serial examinations in a number of countries, particularly Brazil, Argentina, Uruguay, Germany and to lesser degree France and Italy. So far, the use of the method in the United States has remained limited. A few papers on the subject have appeared within the last year. Landberg,²⁴ Potter, Douglas and Burkelo²⁵ and Hirsch.²⁶

A well-organized set up is important for the rapid and efficient functioning of serial examinations. De Abreu advocates the creation of centers for complete thoracic surveys, using photographic installations in each of them. He believes that one million examinations could be done in such a centre in one year, thus making it possible to examine the total population of large cities initially and at routine intervals. Transportable machines have been constructed in Germany²⁷ and with military help an organization has been created which is rather interesting, though its applicability outside of Germany is for many reasons unlikely. The or-

ganization is divided into two branches, one stationary and one motorized. The stationary division supervises the operation of the project, processes the films and makes enlargements when necessary. The motorized division moves from town to town and sets up the equipment two or three times a day. The population is arranged according to size and is then conducted to the fluoroscopic screen. Instructions as to how to behave in front of the screen are issued to the first few subjects, and the rest are asked to imitate these. An automatic phonograph for giving the commands in regard to breathing has even been advised.²⁸ Each person holds in his hand a small card containing the necessary personal data, which is photographed together with the chest. A single machine is reported to be able to examine from four hundred to six hundred persons in one hour. For interpretation the film is magnified by means of a small projection lamp to an area about 10 cm square. One picture after another passes in rapid succession in front of the interpreter, who either dictates a very short report or — by simply placing an always ready sheet of photographic paper on the viewing area — makes a photographic copy of the projected enlargement for further study.²⁹ It is said to be easy for a trained examiner to read five hundred films in one hour especially if most of the patients are healthy, for example, soldiers. The number is smaller if less healthy persons are examined, for example, factory workmen.²⁷ Data thus obtained are stored in central files.

The main importance of such serial examinations is believed to lie in the ability to recognize all cases of tuberculosis. Some authors^{27, 29} have compared a large series of fluoroscopic screen photographs with routine full sized roentgenograms of the same patients, and concluded that active tuberculous processes were diagnosed from the screen photographs in almost all cases. This finding is rather unexpected when all authors admit that the detail and contrast of the screen photographs are definitely inferior to those of the routine roentgen films.* It is thought, however, that the examination represents only an extensive filter which helps to discover grossly diseased as well as possibly diseased persons. The qualitative diagnosis can be made only by clinical examination together with a large routine roentgenogram which should be taken in every case in which disease is found on the screen photographs.

In other words screen photography as yet does not equal the routine roentgen examination, which

*The definition on the far left of 3 photographic films, 75 by 75 mm or 4 by 5 in. is better than that on the commonly used 4-by-36-mm photographic film.

includes fluoroscopy, good roentgenograms in various directions and with various exposures, Bucky films and so forth. One danger of the method lies in the possibility that doctors and patients may not appreciate its limitations, thereby creating an unjustified feeling of safety. For example, if a patient has recently had a negative examination by screen photography, a more adequate roentgenological examination may be delayed if he should develop clinical symptoms. It is likely that the technical qualities of the screen photographs will improve in the near future, so that their clinical use may become advisable in many cases. The danger which is inherent in any serial examination will remain unless the incompleteness of such an examination is adequately stressed.

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MASSACHUSETTS MEDICAL SOCIETY

PROCEEDINGS OF THE COUNCIL

Annual Meeting, May 21, 1940

THE annual meeting of the Council of the Massachusetts Medical Society was held in the Swiss Room of the Copley-Plaza Hotel, Boston, on Tuesday, May 21, at 10.30 a m. The president, Dr Walter G Phippen, Essex South, was in the chair, and 261 councilors were present (Appendix No 1).

The records of the meeting of February 7, 1940, published in the *New England Journal of Medicine*, issue of March 7, 1940, were presented by the Secretary and approved by the Council.

The roll call of the nominating councilors by the Secretary was as follows: W D Kinney, Barnstable, W H Allen, Bristol North, E F Cody, Bristol South, F W Snow, Essex North, Horace Poirier, Essex South, F J Barnard, Franklin, G L Schadt, Hampden, L N Durgin, Hampshire, R R Stratton, Middlesex East, F L Gage, Middlesex North, A W Dudley, Middlesex South, D D Scannell, Norfolk, W G Cur-

tis, Norfolk South, W H Pulsifer, Plymouth, R L DeNormandie (alternate), Suffolk, R P Watkins, Worcester, and C B Gay, Worcester North. (There was no representative from the Berkshire district.) The nominating councilors retired to Parlor A for deliberation.

REPORTS OF STANDING COMMITTEES

Membership

The chairman, Dr H Quimby Gallupe, Middlesex South, read for the purpose of record the supplementary report of his committee which was omitted at the February meeting but published as a supplementary report in the *New England Journal of Medicine*, issue of March 7, 1940, in connection with the February meeting. This part of the report was accepted and the recommendations adopted by the Council.

Dr Gallupe then proceeded with the reading of the current report (Appendix No 2). The

committee recommended that eight fellows be allowed to retire, five be allowed to resign, three be allowed to have their dues remitted, nine be allowed to change their districts without change of legal residence, and two be recommended for affiliate fellowship in the American Medical Association. The report was accepted and the recommendations adopted.

Ethics and Discipline

The report (Appendix No 3) was presented by the chairman, Dr Robert L DeNormandie, Suffolk.

In response to a question by Dr Norman A Welch, Norfolk, the President stated that the formal complaint made in February concerning certain fellows of the Society was still in committee. The report was accepted by vote of the Council.

Medical Education and Medical Diplomas

The report (Appendix No 4) was presented by the chairman, Dr Reginald Fitz, Suffolk, and was duly accepted.

Dr Fitz then introduced a recommendation from the committee that the Committee on Medical Education and Medical Diplomas be directed to redraft Section 5 of Chapter VII of the by laws and to report at the next meeting of the Council.

The Secretary suggested that the recommendation be somewhat more inclusive and include the phrase "and such other by laws as may apply." The suggestion was accepted by Dr Fitz. The altered recommendation was duly passed by the Council.

State and National Legislation

The report was presented by the chairman, Dr E. Lester Merritt, Bristol South. This being an off season, with regard to state legislation, there were no local matters to report. The committee met on May 15 to discuss certain bills now before Congress. The committee recommended that House Bill 8963, introduced by Representative Toland of California, be opposed. This bill would give to chiropractors the right to treat injured federal employees who are entitled to benefits under the United States Employees Conference Act. The hearing was scheduled for May 22. The Council voted to approve of a telegraphic protest to the Judiciary Subcommittee in the name of the Society. The report was accepted.

Medical Defense

The chairman, Dr Arthur W Allen, Suffolk,

presented the report of the committee (Appendix No 5). The Council voted to accept it.

REPORTS OF SPECIAL COMMITTEES

Postgraduate Instruction

The report (Appendix No 6) was presented by the chairman, Dr Frank R Ober, Suffolk, and was accepted by the Council.

The Council approved of the recommendation that the committee be continued.

Physical Therapy

The report (Appendix No 7) was presented by the chairman Dr Franklin P Lowry, Middlesex South and was duly accepted.

Industrial Health

The report (Appendix No 8) was presented by Dr Louis R Daniels, Middlesex South, and was accepted by vote of the Council.

Public Relations

The report (Appendix No 9) was presented by the secretary of the committee, Dr Elmer S Bagnall, Essex North.

Paragraph 1 of the report was accepted and approved.

Paragraph 2 was accepted and the recommendations approved. Under the by laws, the request for an appropriation of \$150 was referred to the Committee on Financial Planning and Budget.

In connection with Paragraph 3, Dr Thomas H. Lanman, Suffolk, chairman of the special committee appointed by the President to study medical costs insurance plans, was asked to present his report which was made a part of the report of the Committee on Public Relations.

The Committee on Public Relations made the following recommendations:

Any plan for prepaid medical care, sponsored by the Massachusetts Medical Society should meet the following five requirements:

- 1 That it be on a voluntary basis and available to those with low or moderate incomes.
- 2 That it include the subscriber's free choice of physician.
- 3 That the Massachusetts Medical Society have supervisory control through the properly appointed general and local committees.
- 4 That it comply with the laws governing insurance in this state.
- 5 That the education of the public regarding such plans be left insofar as possible to the physician and his individual patient of the individual locality but working with and under a special committee duly appointed by the state society.

This portion of the report was duly accepted. There was some discussion regarding the phrase

"free choice of physician" Dr Lincoln Davis, Suffolk, was of the opinion that the phrase sounded well, but its inclusion would make it difficult to maintain standards of practice. Dr Brainard F Conley, Middlesex South was of the opinion that the recommendation made was important in that it encouraged a continuation of doctor-patient relations. Dr Merritt agreed with Dr Conley. Dr Welch pointed out that legally the only method of qualifying men to practice medicine rests with the Board of Registration in Medicine.

After some further discussion, the Council moved to adopt the recommendations of the Committee on Public Relations. It was then voted to accept the report of the committee as a whole.

Restoration to Fellowship

Restoration to fellowship, with the usual provision regarding payment of dues, was authorized by the Council for the following four former members:

- Lionel M Cole, Pittsfield (Committee Maurice S Eisner, Garvey Adeson and George M Shipton)
- Paul R. Donovan, Revere (Committee Earle M. Chapman, Harold L. Musgrave and George L. Gately)
- H R. Record, Quincy (Committee Cornelius J Lynch, Cornelius A. Sullivan and William J McCausland)
- Frank J Vaccaro, Pittsfield (Committee Henry H. Bard, Newell N. Copeland and Modestino Criscitello)

Restoration to fellowship was not recommended for the following former member:

- Roland O Parris, Falmouth (Committee John I B Vail, John P Nickerson and Julius G Kelley)

Nominating Committee

Dr Edmond F Cody, Bristol South, reported for the Nominating Committee the following nominations for office:

- For president Walter G Phippen, Salem.
- For vice president Frank R. Ober, Boston.
- For secretary Alexander S Begg, West Roxbury.
- For treasurer Charles S Butler, Boston.
- For orator A. Warren Stearns, Billerica.

There being no further nominations, it was voted that nominations cease and that the Secretary be directed to cast one ballot for the officers nominated by the committee. The Secretary announced that he had cast the ballot and that the officers were duly elected.

APPOINTMENTS OF COMMITTEES

The President then proceeded to announce his

nominations for appointment to the various standing and special committees (These committees will be published with the proceedings of the Society in the July 4, 1940 issue of the *Journal*). The list of appointments was duly approved by the Council.

The following committees were approved by the Council to consider the petitions for restoration to fellowship of the following six former members:

- For Julian C Gant, Arlington
Edwin P Suchner, Alfred Weller and Letitia D Adams
- For Edward J Kelley, Watertown
Albert B Toppan, Pericles Canzanelli and Eugene F Gorman.
- For Burton E. Lovesey, Roslindale
Guy F Blood, John F Ford and John J Elliott.
- For Julian D Lucas, Brookline
Edward L. Kichham, Frederick J Bailey and Maurice Gerstein.
- For Joseph Rosenthal, Roxbury
Sidney H. Weiner, Hyman Morrison and Joseph Laserson.
- For Louis F Salerno, East Boston
Harvey A. Kelly, George H. Schwartz and Raymond B Parker.

INCIDENTAL BUSINESS

The application of Dr Thurlow H Pelton, of Pittsfield, was received at headquarters too late to be included in the list of applicants published in the *Journal*. He appeared before the Board of Censors and was duly examined and passed. The Council approved of the action taken.

The Council voted to approve the action of the Board of Censors of Middlesex South District in giving a postponed examination to Dr Alan R. Moritz who did not receive official notification of the regular meeting.

The Council voted to approve the President's appointment of Dr Ernest L. Hunt, Worcester, as alternate delegate to the House of Delegates of the American Medical Association, to take the place of Dr Arthur W. Marsh.

The Secretary called attention to the necessity for the councilors to sign the attendance books. Reports of attendance by councilors are compiled from these books and supplied to the various district societies. The nominating committees of the district societies frequently are influenced, in their choice of councilors, by these reports.

The meeting adjourned at 11.55 a.m.

ALEXANDER S BEGG *Secretary*

APPENDIX NO. 1

ATTENDANCE

BARNSTABLE

O S. Simpson
M. E. Champion
W D Kinney

BERKSHIRE

J J Boland
I. S. F. Dodd
P J Sullivan

BRISTOL NORTH

W H. Allen
P H. Dunbar
J L. Murphy
W H. Swift

BRISTOL SOUTH

H. E. Perry
G W Blood
R. B. Butler
E. F. Cody
J A. Fourmier
E. D. Gardner
E. L. Merritt
I. N. Tilden
P E. Truesdale

ESSEX NORTH

R. C. Norris
E. S. Bagnall
R. V. Bakel
C. S. Benson
E. H. Ganley
H. R. Kurth
P J Look
L. C. Pearce
G. L. Richardson
F W Snow
T N Stone
C. A. Weiss

ESSEX SOUTH

Loring Grimes
H. A. Boyle
N P Breed
C. L. Curtis
J F Donaldson
R. E. Foss
S. E. Golden
P P Johnson
J F Jordan
A. E. Parkhurst
W G Phippen
Horace Poirier
E. D. Reynolds
J R. Shaughnessy
J W Trask
C. F. Twomey

FRANKLIN

A. H. Wright
P J Barnard
A. H. Ellis
W J Pelleuer

HAMPTDEN

F H Allen
T S. Bacon
W C. Barnes
J M. Birnie
W A R Chapin
J L. Chereskin
E. C. Dubois
P E. Gear
Frederic Hagler
E. A. Knowlton
M. W. Pearson
A. G. Rice
G L. Schadt
G L. Steele

HAMPSHIRE

A. J. Bonnevillie
J D Collins
L N Durgin

MIDDLESEX EAST

G R. Murphv
J H. Blaisdell
Richard Dutton
E. M. Halligan
J H. Kernigan
L. L. MacLachlan
R. W. Sheehy
R. R. Stratton

MIDDLESEX NORTH

R. L. Drapeau
D J Ellison
F L Gage
A R. Gardner
G A. Leahy
E O. Tabor
M A. Tighe

MIDDLESEX SOUTH

Dwight O Hara
C. F. Atwood
E. W. Barron
W B. Bartlett
Harris Bass
E. H. Bigelow
G. F. H. Bowers
R. W. Buck
E J Butler
Richard Collins, Jr
B. F. Conley
P A. Consales
D F Cummings
C. H. Dalton
L. R. Daniels*
H. F. Day
C. L. Denck
J E. Dodd
A. W. Dudley
E. R. Fleming
H. Q. Gallupe
W J. Gay
H. G. Giddings

H. W. Godfrey
B. I. Goldberg
A. D. Guthrie
A. M. Jackson
A. A. Levi
F P Lowry
A. N. Makechmie
R. A. McCarty
J A. McLean
Edward Mellus
J C. Merriam
C. E. Mongan
J P. Nelligan
E. J. O'Brien
Max Ritvo

E. S. A. Robinson
E. F. Ryan
M J. Schlesinger
W N. Secord
J W. Sever
E. F. Sewall
E. W. Small
H. P. Stevens
R. A. Taylor
H. W. Thayer
J H. Townsend
R. H. Wells
Hokhanes Zovickian

NORFOLK

F P McCarthy
J D Adams
J R. Barry
Carl Bearse
A S. Begg
M I. Berman
F S. Cruickshank
William Dameshek
F P Denny
G L. Doherty
D G. Eldridge
J J. Elliott
H. M. Emmons
J C. V. Fisher
Susannah Friedman
Maurice Gerstein
David Glunts
W A. Griffin
B T. Guild
J B. Hall
R. J. Heffernan
Morris Ingall
I R. Jankelson
C J. Kackham
C. J. E. Kackham
E. L. Kackham
D L. Lionberger
D S. Luce
D L. Lynch
T F P. Lyons
Charles Malone
F J. Moran
M. W. O'Connell
Frederick Reis
S. A. Robins
S. M. Saltz
D D. Scannell
Nathan Sidel
J W. Spellman

M. H. Spellman
J P. Treanor Jr
W J. Walton
H. F. R. Watts
N A. Welch

NORFOLK SOUTH

D B. Reardon
C. S. Adams
H. H. A. Blyth
R. L. Cook
W G. Curtis
G V. Higgins
H. A. Robinson
W L. Sargent

PLYMOUTH

J E. Brady
A. L. Duncombe
P B. Kelly
P H. Leavitt
R. C. McLeod
G A. Moore
D W. Pope
W H. Pulsifer
F F. Weiner

SUFFOLK

A. A. Horner
A. W. Allen
W J. Brickley
W E. Browne
C. S. Butler
E. M. Chapman
David Cherver
M H. Clifford
Lincoln Davis
R. L. DeNormandie
N W. Faxon
G B. Fenwick
Reginald Fitz
Channing Frothingham
M N. Fulton
Joseph Garland
John Homans
Rudolph Jacoby
H A. Kelly
T H. Lanman
R. I. Lee
C. C. Lund
G R. Minot
W J. Mixer
J P. Monks
Donald Munro
H. L. Musgrave
R. N. Nye
P R. Ober
J P. O'Hare
L. E. Parkins
L. E. Phaneuf
Helen S. Pluman
G C. Shattuck
R. M. Smith
M. C. Sosnan
Augustus Thorndike, Jr
E. F. Timmins
S. N. Vose
Shields Warren
Conrad Wesselhoeft
C. F. Wilinsky

WORCESTER

J M Melick
J C Austin
Gordon Berry
W P Bowers
L R Bragg
P H Cook
G E Emery
J M Fallon
J J Goodwin
E L Hunt
E R Leib
J C McCann
J W O'Connor

*By invitation

C A Sparrow
G C Tully
R J Ward
F H Washburn
R P Watkins

WORCESTER NORTH

B P Sweeney
E A Adams
H C Arey
J J Curley
T R Donovan
C B Gay
J C Hales

Total 261

Knowlton, Wilson W, Waltham
Marshall, Samuel F, West Newton

From Norfolk to Middlesex South

Loizeaux, Marion C, Wellesley

From Norfolk to Suffolk

Butler, Alice E, Wellesley
Ferguson, Charles F, Wellesley
Harvey, Earle A, Brookline
Salter, William T, Milton

From Norfolk to Worcester

Brown, Bessie F, Wrentham

H. QUIMBY GALLUPE, *Chairman*

APPENDIX NO 2

REPORT OF THE COMMITTEE ON MEMBERSHIP

The committee recommends

1 That the following named eight fellows be allowed to retire under the provisions of Chapter I, Section 5, of the by-laws

Blanchette, William H, Fall River
Doucett, Frederick L, East Weymouth
Leach, Albert C, Orange
Park, Francis E., Stoneham
Patterson, Alice M, Marblehead, with remission of dues for 1940
Pothier, Joseph C, New Bedford, with remission of dues for 1940
Potter, Lester F, New Bedford
Starbird, Edward P, Dorchester, with remission of dues for 1940

2 That the following named five fellows be allowed to resign under the provisions of Chapter I, Section 7, of the by laws

Bushold, Fred G, Hampton, New Hampshire, with remission of dues for 1940
Durant, Richard C, Honolulu, Hawaii
Shain, Joseph H., Boston, with remission of dues for 1938, 1939 and 1940
Teel, Harold M., Polson, Montana, with remission of dues for 1940
Wattles, Merrill, Palatka, Florida

3 That the following named two retired fellows be recommended for affiliate fellowship in the American Medical Association

MacCarthy, Francis H, Gilford, New Hampshire
Starb rd, Edward P, Dorchester

4 That the dues of the following named three fellows be remitted under the provisions of Chapter I, Section 6, of the by-laws

Booth, Ernest L., East Boston, 1937, 1938, 1939 and 1940
Campbell, Franklin E, West Medford, 1940
Strongman, Bessie T, Pittsfield, 1940

5 That the following named nine fellows be allowed to change their membership from one district society to another without change of legal residence, under the provisions of Chapter III, Section 3, of the by-laws

From Middlesex South to Suffolk

Castleman, Benjamin, Belmont

APPENDIX NO 3

REPORT OF THE COMMITTEE ON ETHICS AND DISCIPLINE

The Committee on Ethics and Discipline has held four long meetings since the last report. Besides these meetings of the whole committee, the secretary and the chairman have answered over the telephone many questions of minor importance. Scarcely a week goes by that some fellow does not appeal for clarification of some point that disturbs him. In the large majority of such appeals, one or the other of the committee usually can straighten out the difficulty and the matter does not come before the whole committee.

Petty publicity causes the committee much annoyance. Letters are constantly received from fellows enclosing photographs of physicians which have appeared in newspapers. In two or three cities, so called "personality sketches" of doctors have made their appearance. Cards in various church or fair programs, signs several feet long and illuminated, signs with the doctor's name and his specialty, advertisements in local newspapers giving addresses, office hours, telephone numbers and types of work, as well as statements of membership in societies—these are a few of the types of publicity that the committee has attempted to stop. In all cases the physician's attention has been called to the objections to such publicity, and they have given it up. The nuisance, however, persists, and the committee believes that this statement calling the attention of the fellows to such undignified practices may help to put a complete stop to them.

Several complaints against fellows have been made which have been investigated and satisfactorily adjusted.

The committee has given hearings to three fellows, two because of complaints made by patients regarding fees. These were studied and satisfactory adjustments were made. The third hearing was to a fellow charged with incompetent surgery. The various aspects of this case were discussed with the fellow. He was frankly and severely reprimanded by the committee.

When the Medical and Surgical Associates met with the committee, Dr Phippen presided. The chairman took no part in the presentation of the facts, and was not present during the subsequent discussion by the committee. The committee has the whole problem before it for further consideration.

Several matters are still being investigated on which no final conclusion has been reached.

ROBERT L. DENORMANDIE, *Chairman*

APPENDIX NO 4

REPORT OF THE COMMITTEE ON MEDICAL EDUCATION
AND MEDICAL DIPLOMAS

The committee has met twice during the past year. Our chief duty has been to scrutinize diplomas presented by candidates for fellowship who are graduates from foreign medical schools or from schools not recognized by the Society. At our two meetings we have interviewed 104 such candidates. Of such candidates whose diplomas were recognized by the committee, 42 have been passed by the examining censors in the various districts. Thus, of the 245 names added to the roster of the Massachusetts Medical Society since the last annual meeting 17 per cent are those of graduates of foreign or unrecognized schools.

The problem of the graduate of a foreign medical school or of an unrecognized school continues to be no less baffling now than in previous years. The ordinary doctor licensed to practice medicine in Massachusetts finds that membership in the Massachusetts Medical Society is useful. Membership is particularly useful as a means of opening the door to hospital appointments. It is a rare hospital which will accept on its staff a physician who has not among his credentials his certificate of membership.

On the other hand, medical educators are of the opinion that internships now are an integral part of a doctor's educational program. At the October meeting of the Association of American Medical Colleges, this organization voted that its executive council be authorized to proceed with the formulation of minimum educational standards for acceptable internships and prepare a list of hospitals meeting these standards. Many Massachusetts hospitals meet these standards. Many Massachusetts hospitals wish to train interns and appreciate that unless their staff is sufficiently competent recognition for intern training is unlikely. Thus, your committee finds itself balanced on a precarious perch. On the one hand we are assailed by fellows who believe that our interpretation of the by laws is too liberal, and on the other by doctors who say earnestly that the by laws, as we have interpreted them, discriminate unfairly against certain licensed practitioners who have every right, under the laws of the Commonwealth, to work without stigma.

Your Committee finds the present by laws, as they concern our work, not entirely satisfactory. As the number of applicants who appear before us has increased year by year we have come to serve more as a committee on credentials than for any other purpose and we believe that the several districts might set up credential committees which could operate locally with greater intelligence than can we. Such subcommittees should be in a better position to obtain truly confidential information concerning candidates than are we and should be of great assistance to us in helping to select the best candidates for membership in the Society from doctors who are graduates of foreign medical schools or of schools not recognized by the Society. Therefore your committee asks for a resolution directing it to re-draft Section 5 of Chapter VII of the by laws and to report on this matter at the next meeting of the Council.

This year a prize of fifty dollars was again offered for the best written and most comprehensive case report submitted by an intern holding an internship in any Massachusetts hospital approved by the American Medical Association for intern training. This is a valuable means of stimulating better writing and clearer thinking among younger men. The president of the Boston Medical Library, the editor of the *New England Journal of Medicine* and the chairman of the Committee on Medical Education

and Medical Diplomas served as judges. Six case reports were submitted. The prize was awarded to Dr. Victor G. Balboni, a graduate of the Harvard Medical School in 1939 for his case report "Multiple Pulmonary Thrombi Associated with Cyanosis and Right-sided Cardiac Hypertrophy." This case was studied by him while he was an intern in pathology at the Peter Bent Brigham Hospital.

Your committee has followed the postgraduate education program of the Society with much interest. The courses given in the districts and the New England Postgraduate Assembly appeal to us as being efforts in the right direction. This year's program of the annual meeting also appears to us to be of greater educational value than ever before.

REGINALD FITZ, *Chairman*
ARCHIBALD R. GARDNER
GEORGE D. HENDERSON
JOHN P. MONKS,
A. WARREN STEARNS.

APPENDIX NO 5

REPORT OF THE COMMITTEE ON MEDICAL DEFENSE

During the past year there have been two new cases accepted for defense. In each there is no evidence of malpractice. Both cases will be allowed to come to trial.

Two cases have been disposed of during the past year. One, which came to trial, had a verdict returned by the jury for the defendant. The other case reached trial but a companion case defended by an insurance company was settled by the company in such a way that the member who was being defended by us was also released as a part of the settlement.

There are at present a total of eight cases pending. There is one threatened lawsuit which probably will not be carried any farther.

The committee believes that the Society should continue to maintain this legal protection against malpractice suits even though a good percentage of the members carry malpractice insurance. The mere fact that the Society will not settle any suit out of court has a definite reaction against the establishment of such suits; thus, we believe, to be beneficial to the Society as a whole.

ARTHUR W. ALLEN, *Chairman*
HORATIO ROGERS, *Secretary*
EDWIN D. GARDNER,
FREDERICK B. SWEET
WILLIAM R. MORRISON

APPENDIX NO 6

REPORT OF THE COMMITTEE ON POSTGRADUATE INSTRUCTION

On April 25, 1940, the postgraduate extension courses ended for the academic year 1939-1940. The total enrollment for this year was 984, a gain of 23.7 per cent over the previous year, the enrollment in 1938-1939 being 795. The detailed attendance record is attached. The Society again presented the extension programs in co-operation with the Massachusetts Department of Public Health, the United States Public Health Service and the Federal Children's Bureau. The Department of Public Health has assisted the committee in carrying forward this program of instruction; the committee wishes to thank Dr. Jakiniah, the commissioner of public health for his co-operation.

Teaching clinics were instituted in Franklin, Berkshire and Bristol counties, these were rated very successful and show that case demonstration and teaching can be done well in any locality where the profession will provide the necessary facilities. The committee hopes that other districts will try this method of teaching.

Clinical teaching was given again this year in gonorrhea and syphilis, at the Boston Dispensary Gonorrhea Clinic, student physicians made forty-nine clinic visits, while at the Massachusetts General Hospital Syphilis Clinic,

ATTENDANCE — POSTGRADUATE EXTENSION COURSES

| DISTRICT | PLACE | 1938 | 1939 | 1940 |
|-----------------|-------------|-------------|-------------|------|
| Barnstable | Hyannis | 22 | 33 | 23 |
| Berkshire | Pittsfield | 55 | 45 | 50 |
| Bristol North | Taunton | 27 | 31 | 20 |
| Bristol South | Fall River | 20 | 36 | 22 |
| | New Bedford | 38 | 34 | 34 |
| Essex North | Lawrence | 31 | 48 | 52 |
| Essex South | Salem | 58 | 54 | 59 |
| Franklin | Greenfield | 28 | 27 | 47 |
| Hampden | Holyoke | 33 | 30 | 40 |
| | Springfield | 50 | 40 | 100 |
| Hampshire | Northampton | 32 | 30 | 32 |
| Middlesex East | Melrose | 42 | 21 | 54 |
| Middlesex North | Lowell | 32 | 21 | 25 |
| Middlesex South | Cambridge | 80 | 50 | 80 |
| Norfolk | Norwood | 24 | (no course) | 26 |
| Norfolk South | Quincy | 30 | 25 | 20 |
| Plymouth | Brockton | 37 | 35 | 27 |
| Suffolk | Boston | (no course) | 180 | 172 |
| Worcester | Milford | 23 | 20 | 30 |
| | Worcester | (no course) | (no course) | 45 |
| Worcester North | Fitchburg | 46 | 35 | 26 |
| Totals | | 708 | 795 | 984 |

student physicians made one hundred and eleven clinic visits. The attendance has dropped from last year but the committee hopes to improve this important phase of postgraduate instruction.

The outline for next year's postgraduate extension program has been made out and a budget presented to the Department of Public Health which will submit it to the government agencies in Washington. It is highly probable that this successful co-operative plan will be continued.

The New England Postgraduate Assembly has been organized for next fall. The assembly will be held in Sanders Theatre and Memorial Hall on Wednesday and Thursday, November 13 and 14, 1940. The speakers will be as follows:

- Dr. Fred L. Adair, Chicago (obstetrics and gynecology)
- Dr. Henry W. Cave, New York City (gastrointestinal diseases)
- Dr. Russell L. Haden, Cleveland (blood diseases)
- Dr. Sumner L. Koch, Chicago (trauma and infection)
- Dr. Robert F. Loeb, New York City (diabetes)
- Dr. T. Grier Miller, Philadelphia (gastroenterology)
- Dr. Oliver S. Ormsby, Chicago (dermatology)
- Dr. Percy S. Pelouze, Philadelphia (urology)
- Dr. Tracy J. Putnam, New York City (neurology)
- Dr. Ralph M. Waters, Madison, Wisconsin (anesthesiology)

The detailed program will be printed in the *New England Journal of Medicine* and also mailed to every physician in the sponsoring states next September.

The committee wishes to express to the faculty of the

extension courses and teaching clinics the appreciation of the Society for its services in maintaining the high standard of teaching.

The fourth annual meeting of the Associated State Postgraduate Committee will be held on June 12, 1940, in New York City during the meeting of the American Medical Association. The committee recommends that the Society authorize the executive committee to send delegates to this meeting.

The committee wishes to express sympathy to the Medical Society of the State of New York in the death of Dr. Thomas P. Farmer, of Syracuse, who was chairman of its postgraduate committee for many years. He was a pioneer in many phases of postgraduate medical education. Dr. Farmer was vice-chairman of the Associated State Postgraduate Committees and was a champion of progressive educational ideas. He succumbed to the effects of radium used in his professional work over a period of many years.

It is recommended that the committee be continued.

FRANK R. OBER, *Chairman*,
LEROY E. PARKINS, *Secretary*

APPENDIX NO 7

REPORT OF THE COMMITTEE ON PHYSICAL THERAPY

During the past year there has been a decidedly increased interest in more adequate undergraduate instruction in physical therapy by medical schools throughout the country. Certain physical therapy methods and principles are now recognized by the medical profession generally as a definite aid in the treatment of various pathologic conditions.

Your committee has for several years attempted to encourage the inclusion of this subject in the curriculums of all the medical schools in this region. The University of Vermont College of Medicine has had definite instruction in this field for four years. Tufts College Medical School began with two hours' instruction a few years ago, and offered eight hours' instruction this year.

A department of physical therapy has recently been started at the Massachusetts General Hospital, and we hope that it will attain the results already achieved by other hospitals of its size and influence in other parts of this country.

This is a helpful sign for future physicians. For those already in practice who wish a practical summary of this subject a cinema has been prepared which demonstrates various methods used in physical therapy. The cinema and speakers may be obtained for medical meetings by communicating with the committee.

FRANKLIN P. LOWRY, *Chairman*
GEORGE R. MINOT,
ROBERT B. OSGOOD

APPENDIX NO 8

REPORT OF THE COMMITTEE ON INDUSTRIAL HEALTH

This committee was first appointed on April 27, 1939, and reappointed June 13, 1939, to co-operate with the American Medical Association in its program for the advancement of better medical care.

Our field is particularly industrial and we are concentrating on the type of activity which we believe will be

helpful to the doctor who is partly or wholly occupied with industrial problems.

The members of the committee are all connected with industry and also maintain contacts with those organizations best equipped to be of help in carrying out this program. These contacts are as follows:

- The Conference Board of Physicians in Industry (National Industrial Conference Board)
- The National Association of Manufacturers
- The Air Hygiene Foundation of America
- The Harvard School of Public Health (Division of Industrial Hygiene)
- The Massachusetts Department of Labor and Industries (Division of Industrial Hygiene)
- Several insurance companies which provide workman's compensation insurance
- A number of individuals especially equipped to advise on industrial medical problems

The committee was represented by two of its members at the second annual Congress on Industrial Health of the American Medical Association at Chicago, January 15 and 16, 1940.

In order to bring the committee to the attention of those whom we are trying to interest it is our opinion that publication of the committee reports in the *Journal* will help.

Three reports have been so published, and we propose to continue along this line until a more intensive program is determined upon.

Four meetings have been held during the year which have been productive in the way of ideas leading toward this more intensive program.

Requests for advice and assistance have been received and we are trying to render service in all these cases.

W. IRVING CLARK, *Chairman*
 LOUIS R. DANIELS, *Secretary*
 NOEL G. MONROE
 HALSTEAD G. MURRAY
 THOMAS L. SHIPMAN

APPENDIX NO 9

REPORT OF THE COMMITTEE ON PUBLIC RELATIONS

1. The Committee on Public Relations considered with a representative of the Massachusetts Department of Public Health and Dr. T. Duckett Jones a proposed plan for the inclusion of a program in this state for the care of initial attacks and the follow-up of children under twelve years of age with rheumatic heart disease. Action on this was postponed pending opportunity for its consideration by the district societies.

2. The committee believes that it is highly desirable that a special study be conducted looking toward better understanding between the profession and the authorized agencies involved in the administration of tax-supported medical care in Massachusetts and urges the adoption of the following recommendation:

That the Council authorize the President to appoint a special committee, sufficiently large to be representative of the State to make a study of tax-supported medical care in Massachusetts, enlisting the co-operation of state, city and town welfare, old age and veterans relief administrators and looking toward better standards of care and better mutual understanding of problems of the physicians and of the public agencies.

That the Council appropriate \$150 for the expenses incident to this study.

And that this special committee report to the Council through the Committee on Public Relations.

3. The Committee on Public Relations submits and endorses the report of the special committee appointed by the President at the last meeting of the Council for the study of medical-costs insurance plans. [Dr. Lanman, chairman of this special committee, then read his report.]

This committee has studied carefully the problem of how the Massachusetts Medical Society can best carry out the vote of the Council of April 1939 to wit:

Voted that the Massachusetts Medical Society take the initiative in the formation of a corporation, non-profit in character which shall seek to pay the medical-care costs of patients." The present duty of this committee is primarily to build a solid foundation on which the detailed structure of such a plan can rest. The foundation must be such that it will merit and receive the wholehearted co-operation of the members of the Society. This committee cannot, and we believe should not attempt at this time to present complete and detailed plans. It should leave the way open for changes and modifications in the detailed applications of this plan that may appear desirable and for which experience may show the need. It is obvious that the problems of various individual localities are different. No one plan can cover effectively the divergent needs of the rural community of the State, the small industrial community and the metropolitan center. Any such plan to be effective will require a great deal of further time and effort. The present plan recently put in effect in the State of Michigan is the result of ten years of careful study and the expenditure of over \$30,000 of the society's funds. For the development of these details, however we have the advantage of the study of the plans of other states, notably those of Michigan and New Jersey. The plans for the superstructure must be flexible. The foundation must be firm and secure. The committee takes cognizance of the fact that the Society has already instructed this committee to proceed with drafting and submitting to the Legislature a proper enabling act which if passed will permit such a plan to operate.

This report discusses five fundamental points which are the basis for the five recommendations we offer namely:

1. Any plan for prepaid medical care or service sponsored by the Massachusetts Medical Society should be on a voluntary basis and should be available to those with low or moderate incomes. The committee is not at this time prepared to express exactly just what limits should be applied in defining low or moderate incomes. The committee at this time asks only that this principle be accepted in abstract.

2. Any plan for prepaid medical care or service should include the subscriber's free choice of physician. This is defined as the choice ordinarily exercised by a patient in the selection of his family physician.

3. The Massachusetts Medical Society should have a supervisory control over any such plan by properly appointed committees, both general and local. The Massachusetts Medical Society under its present charter cannot as a society be made a part of the structure of a plan for prepaid medical care.

4 Any such plan for prepaid medical care or service should comply with the laws governing insurance in this state. For this, four conditions must be met

- a An enabling act of the Legislature
- b Adequate public control by lay and professional groups, the professional groups to be chosen by the Society
- c A non profit basis of operation
- d Exemption of taxes, both federal and state

Nothing in the above conditions, however, is to be construed as being in conflict with the service ofered by any insurance company legally chartered to do business in Massachusetts

It is pertinent to point out that the present plan of the Medical Society of New Jersey was at first not incorporated under the State Commissioner of Banking and Insurance. In spite of legal opinion that such a plan was not insurance, it seemed wiser not only as regards the state society but also as regards protection to the subscriber that its plan be incorporated so as to meet the requirements of the state insurance laws

5 Any plan for prepaid medical care or service for the income groups under consideration involves the education of the public regarding its benefits. This is properly the duty of the family physician, and also requires the creation of a special committee to deal with the public, particularly as regards solicitation of subscribers

Only these five principles are presented at this time. Further details, particularly those relating to plans for the enabling act of the Legislature will, of course, be presented to the Council for its approval as this study progresses

We believe the adoption of these five general and broad principles will serve to establish a foundation for a plan that will operate justly, wisely and in the best interests of the profession and the public

THOMAS H. LANMAN, *Chairman*

The Committee on Public Relations recommends to the Council the adoption of the following principles

We recommend that any plan for prepaid medical care sponsored by the Massachusetts Medical Society should meet these five requirements

- 1 That it be on a voluntary basis and available to those with low or moderate incomes.
- 2 That it include the subscriber's free choice of physician
- 3 That the Massachusetts Medical Society have supervisory control through the properly appointed general and local committees
- 4 That it comply with the laws governing insurance in this State
- 5 That the education of the public regarding such plan be left, insofar as possible, to the physician and his individual patient of the individual locality, but working with and under a special committee duly appointed by the Society

The attention of the Council is invited to the fact that this special committee has already been instructed to endeavor to carry out the vote of the Council of April, 1939, namely, that the Massachusetts Medical Society take the initiative in the formation of a corporation, non profit in character, which shall seek the procurement of enabling legislation at the next session of the Legislature.

The attention of the Council is invited to the fact that the Medical Society of the District of Columbia after thorough investigation has postponed indefinitely the operation of its tentative plan for medical-costs insurance, because of insufficient demand by the people at this time for this kind of service

The Council will also be interested in the fact that the State of Connecticut and some other states have procured enabling legislation but have not yet initiated the service. It will be recognized that careful study and observation of existing and proposed similar plans will be necessary before we can undertake anything in this field, and that the Council will be informed and asked to endorse the enabling legislation and any proposed plans before they are submitted to the Legislature or to the people.

E. S. BAGNALL, *Secretary*

CASE RECORDS OF THE
MASSACHUSETTS GENERAL HOSPITALANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26251

PRESENTATION OF CASE

A twenty-one year-old soda fountain clerk was admitted to the hospital complaining of lower abdominal cramps of five days duration.

The history was obtained chiefly from the patient's parents as he was too ill to give a coherent account.

The patient had been well until one year before admission when he had a night long attack of severe, cramp-like, lower abdominal pain without diarrhea which cleared within some twenty-four hours and required no medical attention. The patient had appeared to be pale and tired for one month before admission. This was attributed to late working hours and poor eating habits. He seemed otherwise well until five nights before entry when, at 3:00 a.m., he suddenly experienced severe, cramp-like, lower abdominal pain. The type of pain was said to have reminded the patient's mother of the illness of another of her sons who had had a ruptured appendix. The cramps persisted intermittently through the night. They were diffuse and low in the abdomen without definite localization. A physician was called that morning and he stated that the illness was not acute appendicitis. The temperature was 100.2°F. A soap-suds enema was given with good results and the passage of much flatus. The pains, however, continued, he became nauseated and vomited immediately afterward. The cramps increased in severity during the remainder of the day, but nevertheless he managed to sleep well. Four days before admission his temperature was 99°F. His food intake was limited to fluids. In the afternoon of this day the pain and temperature elevation returned. At 6 p.m. he experienced his first shaking chill which lasted some fifteen minutes. He was slightly disoriented, and the temperature rose to 103°F. His physician referred him to an outside hospital where during the next three days, the patient had three more shaking chills associated with mild delirium. The last episode occurred twelve hours before admission to this hospital. Throughout this interval the bowel movements were loose, but there was no real diar-

rrhea. The pain became steadier, and there seemed to be a questionable localization of its point of maximum intensity in the right lower quadrant of the abdomen. He was seen in consultation by another physician who referred him to this hospital for further diagnostic studies. There had been almost complete anorexia throughout the entire illness. There had been no known exposure to a contaminated water or milk supply. He was an extra hand in a large drugstore and took many meals there. None of his relatives or friends had experienced a similar illness.

The remaining family and past histories were non-contributory.

Physical examination revealed a remarkably pale, sick looking, thin, flat-chested man who complained of severe abdominal pain. He had a doughy, slightly distended, slightly tympanitic, tender abdomen, with maximal tenderness to deep palpation located in the right lower quadrant. Rebound tenderness was referred to the same region. No costovertebral tenderness was elicited. The liver and spleen were not felt. Peristaltic sounds were high-pitched and active. On fixing the iliopectineal muscles, motions of the legs caused greater pain in the right abdomen than in the left. The rectal examination was negative, and the heart, lungs and extremities were normal.

The temperature was 105°F (a few minutes after a chill), the pulse 90, and the respirations 20.

Examination of the blood revealed a red-cell count of 4,800,000 with 88 per cent hemoglobin, and a white-cell count of 9700 with 82 per cent polymorphonuclears. The urine was negative. The corrected sedimentation rate of the blood was 0.8 mm per minute. The hematocrit was 41 per cent. A blood culture showed no growth. The serum van den Bergh was 1.0 to 1.5 mg per 100 cc with a biphasic reaction.

The patient developed tenderness over the liver edge and the organ slowly enlarged. He continued to run a high spiking temperature with frequent chills. Jaundice appeared and gradually increased. He was given intravenous sulfapyridine to a blood level of 6.2 mg per 100 cc, but because of the obvious gravity of his illness and the steadily increasing symptoms, he was operated on during the fifth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. GREENE FITZHUGH: It seems to me that this was probably a surgical condition. I wonder why he was not operated on before. He could not

have had so much in the way of physical signs in the other hospital as he had here

In summary, there is a five-day story before he came to this hospital of cramp-like lower abdominal pain. A year previously he had had a similar attack which lasted twenty-four hours. On the second day of his illness he had a shaking chill with a temperature of 103°F. On the fourth day he was sent to an outside hospital where he had a daily chill and the pain became localized in the right lower quadrant. I should say it was an excellent story for acute appendicitis followed by pylephlebitis. I assume the diagnosis could not be made early because it was a retrocecal appendix, and no spasm or tenderness was felt over the abdomen until the illness had progressed for several days. The most important finding against my diagnosis is the white-cell count of 9700—usually there is quite a high count with pylephlebitis. I believe that all the other conditions that ought to be considered are likewise surgical. I do not know of any medical condition that gives this picture. Did this case end in death or did it not?

DR TRACY B MALLORY We have chosen to stop the history at the operation.

DR FITZHUGH I assume that it did. Of course if it did not end in death that would almost rule out the diagnosis of pylephlebitis. Assuming it did not end in death, catarrhal jaundice should be considered and might give a white-cell count like this, however, I never saw a case with as many shaking chills as this one had. The liver in catarrhal jaundice usually does not enlarge with such rapidity as it did in this case.

Should we consider regional ileitis? A very rare case starts out, as one of acute appendicitis does, with symptoms of right lower-quadrant pain. That would be so rare that I should not like to give it any serious consideration. A gastrointestinal series would help with the diagnosis. A cecal diverticulum ought to give symptoms of intestinal obstruction with a good deal more vomiting. He had. Should we consider intussusception, that also leads to more vomiting, and expect several small bloody movements, and not have. He probably also would have more severe pain.

Should we consider gallstones? One can have them at twenty-one, but it is an unlikely diagnosis. Furthermore, it is very rare to have pylephlebitis after cholecystitis. The story was one of lower abdominal pain, which ought to put the lesion in the region of the appendix or the cecum, with pain referred below the umbilicus. It would not be a lesion of the large intestine. I assume he had pancreatitis because in such

cases the pain is usually localized in the epigastrium, radiates through to the back, and is steady and excruciating, with more vomiting and shock than he had. About half the cases of pylephlebitis follow appendicitis. A rare case follows gastric or duodenal ulcer, and a few are secondary to ischio-rectal abscess, pancreatitis, cholecystitis and abscess of the spleen. I do not believe they are worth considering seriously.

This young man was not operated on for several days because his physical signs and laboratory findings were obscure. They fit in best with a diagnosis of acute appendicitis followed by pylephlebitis, in spite of the low white-cell count.

DR. MALLORY Do any surgeons care to comment, or other medical men?

DR MILTON H CLIFFORD After the Chicago amebic dysentery epidemic were there not a number of liver abscesses not dissimilar to this case?

DR WYMAN RICHARDSON I remember one that was similar to this case, however, I should hate to make that diagnosis here. I agree with Dr Fitzhugh.

DR LELAND S MCKITTRICK Dr Fitzhugh has made this so easy that it is rather embarrassing to some of us surgeons. It must be particularly embarrassing to a most highly respected member of our surgical staff who sent the patient in as a typhoid case because of the fever, low pulse and low white-cell count, and one wonders if the problem was as difficult as we made it out. He entered the Emergency Ward and went on the medical service, so apparently the diagnosis was not obvious to the members of the hospital staff who saw him on admission. The diagnosis given by Dr Fitzhugh is the diagnosis which was made after his admission to the hospital, and I think he has gone right to the point very clearly and very well. I should like to bring out one point in relation to early diagnosis. I saw him the morning after his admission, and I defy anyone to have made an accurate diagnosis of appendicitis on the physical findings which he presented that morning. Save for abdominal distention, his physical findings were as nearly zero, so far as the abdominal and rectal examinations were concerned, as is possible. I bring that out because I think it is of utmost importance to be as decisive and conclusive as Dr Fitzhugh has been on slight evidence, and that evidence, I think, is covered by him when he said, "I do not know of any medical condition that gives this picture." The early diagnosis and early treatment of this group of cases must be based on the history of the chills and fever, a little abdominal pain and most in

definite findings in the absence of any other explanation

Would you like me to go farther and say what we found?

DR. MALLORY If you had seen this patient within the first twenty four hours of the illness, do you think you would have operated at that time?

DR. McKITTRICK I think I should have, simply because I had seen one similar case before. An early operation would have made a great deal of difference.

There have been reported in the past year three or four cases of apparent pylephlebitis which have been cured by chemotherapy.* I put that in because Dr. Fitzhugh was going to base so much of his diagnosis on fatal termination, and also in partial justification of the treatment that was carried out on this young man after the diagnosis had been made. I think that is of importance because there has been a great deal written about the value of ligation of the ileocolic vein in the early stages of pylephlebitis. There are reported cases in which this procedure seems to have given dramatic results. It was advocated for this patient.

DR. MALLORY Do you want to describe the operative findings?

DR. McKITTRICK We operated and found a thrombosed cord along the course of what we interpreted as being the ileocolic vein. It is of significance that when that was done, approximately nine days after onset, this cord, which was at least 5 mm. in diameter, was nonpulsating and we could not identify the artery. There were marked edema of the mesentery and enlargement of the lymph nodes, both of which obscured the anatomic landmarks. We could feel only this inflammatory cord running along the course of the vessels and were unwilling to ligate it without identifying the artery. We were unable to feel pulsation. We finally identified it as the artery by opening it but did not have the courage to ligate both artery and attached vein. We stopped the operation at that point after taking out the appendix. The appendix was gangrenous.

There is one other point of importance. When we first opened the abdomen we were doubtful of the diagnosis. There was no excess of free fluid. The omentum was normal to superficial inspection. The appendix was over the brim of the pelvis, the tip gangrenous, with about a table spoonful of pus about it.

CLINICAL DIAGNOSES

Acute appendicitis with rupture and abscess formation
Pylephlebitis
Liver abscesses

DR. FITZHUGH'S DIAGNOSES

Acute appendicitis.
Pylephlebitis

ANATOMICAL DIAGNOSES

(Acute appendicitis)
Phlebitis, right colic and ileocolic veins.
Periphebitic retroperitoneal abscess
Liver abscesses, multiple
Icterus
Pulmonary edema
Operative wound appendectomy

PATHOLOGICAL DISCUSSION

DR. MALLORY Following operation nothing dramatic occurred, although the course was steadily downward. An attempt was made to visualize the expected abscesses in the liver by the use of Thorotrast. Dr. Holmes has the films here.

DR. GEORGE W. HOLMES You can readily see the whole outline of the liver. There are mottled areas of diminished density surrounded by zones of increased density in the liver. Thorotrast is supposed to increase the density in the normal portions of the liver, and if there is an abscess it leaves a dark area on the films, the same thing happening if there are metastatic nodules in the liver. If this does represent abscess formation it would have to be multiple small abscesses. I do not believe this is the normal appearance of the liver following Thorotrast. I should like to add that Thorotrast is a radio-active substance and should never be given except in very doubtful cases or in cases, such as those of advanced cancer in which life-expectancy is reasonably short.

DR. McKITTRICK That was duly considered here and the material was given with the remote hope that it might show a single abscess rather than multiple ones.

DR. MALLORY Do you want to describe the terminal course?

DR. McKITTRICK He simply became more and more jaundiced and gradually went downhill and died—a picture of sepsis and liver damage.

DR. EUGENE R. SULLIVAN I might point out in defense of the medical service that Dr. Beckman and I saw this patient in the Emergency Ward and thought he had a ruptured appendix. We treated

him with Ochsnerization from the moment he came into the hospital

DR MALLORY The postmortem examination showed that he did have pyelphlebitis and extensive abscess formation in the liver. The abscesses were so numerous and small and so widespread that drainage would have been quite out of the question. The path of the infection was somewhat peculiar. The ileocolic and right colic veins were locally thrombosed, but the thrombosis did not extend to the portal vein. On the other hand, a retroperitoneal abscess was found at approximately what must have been the bed of the appendix, and this had burrowed its way through the leaves of the mesentery up along all the veins. The veins were quite patent but were bathed in collections of pus which extended all the way up along the portal vein to the hilus of the liver. The major evidence of infection at autopsy was outside the veins rather than in them. There was rather marked dilation of the small bowel, and a kink about an adhesive band was demonstrated in the lower ileum, although it was thought that the adhesions were recent and had probably formed since the appendectomy. The liver abscesses contained gas and foul-smelling pus. The lungs showed marked terminal pulmonary edema and nothing else of great significance.

DR McKITTRICK I find it difficult to clear my mind on this question of ligating the ileocolic vein. It has very free anastomoses, and the blood from that area goes back into the portal system, regardless of whether it goes through the ileocolic vein or takes another channel. Therefore, I wonder how important ligation is, and how much benefit actually comes from closing one main avenue of return which is already thrombosed. Have you any thought on that?

DR MALLORY I do not see any clear logic behind it.

A PHYSICIAN In considering the differential diagnosis at the time of admission was not the initial chill weighty evidence against typhoid fever?

DR RICHARDSON We had one case of typhoid fever in which the patient had a chill. I think repeated chills would be distinct evidence against it.

DR CHESTER M. JONES We have had one or two cases with a single chill. It is very uncommon to have more than one, and that usually comes at the onset, I think.

CASE 26252

PRESENTATION OF CASE

A nineteen-year-old, American born, married Jewish girl was admitted to the hospital complaining of a gradually enlarging abdomen.

Approximately two and a half years before admission the patient first noted the presence of a steady, dull, somewhat ill-defined aching pain located in the left upper abdomen beneath the rib margins. This discomfort continued, and two years before entry she noticed a lump in the left upper abdomen in the same vicinity in which the pain was arising. She was otherwise well and led a fairly normal life until six months before admission, when she became cognizant that the same quadrant of the abdomen was swelling. It seemed to enlarge to the left and was definitely hard. With the increasing abdominal enlargement the patient experienced mild distress in breathing deeply and complained of a sensation of fullness after the ingestion of moderate sized meals. The constant pain had many superimposed sharp twinges. There was no vomiting, but for several months there was slight morning nausea. She denied pregnancy and stated that her catamenia had been normal. The last menstrual period had occurred five days before admission, and the one previous to that occurred three and a half weeks before admission, with normal flow and no clots or pain. During her illness there had been no change in weight. She noted an increasing easy fatigability, and because of the abdominal mass, discomfort while walking.

The family, marital and past histories were non-contributory.

Physical examination revealed a healthy appearing, obese girl. She had a very slight mustache, with stiff but sparse hairs on the chin, hairs on the chest, and a masculine distribution of the pubic hair. Examination of the heart and lungs was negative. The blood pressure was 130 systolic, 100 diastolic. The abdomen was protuberant and slightly asymmetrical, so that the left upper quadrant bulged slightly more than did the right. To palpation, a cystic, smooth ovoid tumor mass was noted, which transmitted a good fluid wave. There was no shifting dullness in the flanks. The tumor moved slightly on respiration. Rectal examination showed a slightly enlarged nulliparous cervix. One examiner averred that the mass seemed to arise from the pelvis, but

stated that there was too much tension for the proper examination of the pelvic organs.

The temperature, pulse and respirations were normal

Examination of the blood showed a red-cell count of 3,700,000 with 75 per cent hemoglobin, and a white-cell count of 12,600 with 75 per cent polymorphonuclears, the smear was essentially normal. The stools were negative for occult blood. A blood Hinton test was negative. The serum nonprotein nitrogen and serum protein were normal. A sugar tolerance test showed the following findings: fasting, 74 mg per 100 cc.; thirty minutes, 176 mg; one hour, 167 mg; two hours 77 mg. Urine examinations showed specific gravities of 1.018 to 1.028, 0 to ++ albumin and 5 to 10 white blood cells per high-power field. A urine culture showed a moderate growth of non-hemolytic streptococci. The vital capacity was 3250 cc.

Röntgenograms of the abdomen revealed an unusually large soft-tissue mass completely filling the upper abdomen and extending downward to the level of the lower border of the left sacroiliac joint. The margins of this mass were smoothly rounded and sharply defined. Intravenous pyelograms showed that the dye appeared promptly on the right side and that the right pelvis and calyces were normal. On the left in one of the films there was a small quantity of dye visualized in a region that probably represented the pelvis of a normal left kidney. Retrograde pyelograms showed normal-sized kidney pelves. The calyces were incompletely demonstrated. The left kidney was displaced downward. All the visible bones appeared definitely older than those indicated by the patient's age. This was particularly true in regard to the lower lumbar vertebrae which showed wavy configurations of their surfaces. All the visible epiphyses were closed. A chest plate revealed high diaphragms, which were regular in outline. The lung fields were clear. The heart was normal in size and shape. There was no evidence of metastases. By fluoroscopy the left diaphragm was seen to move poorly while the right diaphragm showed fair motion. A swallow of barium with fluoroscopic observations showed that the stomach and small intestines were markedly displaced to the right and posteriorly by the huge mass. A barium enema revealed that the splenic flexure was markedly displaced downward by the tumor mass, the transverse colon running along the lower edge of the tumor. The hepatic flexure was not displaced.

The patient was studied extensively. Except for the presence of the abdominal mass she was

asymptomatic. A 17-ketosteroid determination was normal (9 mg per 100 cc.) An operation was performed on the fourteenth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. ALFRED KRANES The problem here is to guess the localization and nature of this large abdominal tumor. The history is helpful in some respects but is non-contributory, for the most part, since the symptoms are essentially those of pressure from an enlarging abdominal mass, most of her discomfort being due either to pressure on the surrounding organs or to the effects of gravity on the tumor. The history may be of importance in helping us to localize this tumor since the early symptoms were confined to the left upper quadrant and it is fair to assume that the tumor originated in that locality. It probably was present for a good deal longer than two years because by the time patients notice abdominal lumps they usually are quite large and fairly well advanced probably having been present for a long time.

Physical examination is helpful chiefly because it tells us that this mass was apparently cystic, an observation which I think we shall have to take quite seriously. Furthermore a fluid wave was felt which if correct—and I think we have to assume that it was,—confirms the cystic nature of the mass and obligingly allows us to leave out of consideration all the solid tumors of the abdomen thus confining ourselves to the cystic ones. On the law of chances alone it is likely to be cystic because of its size. We have to assume that this was a fairly large mass because of the x-ray description and on account of the history although there is nothing actually said about its size on physical examination. It apparently fills the left side of the abdomen but the physical examination says nothing about that. As to the pelvic examination I do not believe one can tell once a tumor reaches this size, where it originated. The statement that it seemed to arise from the pelvis one cannot take too seriously. On physical examination a tumor of this size may seem to arise anywhere in the abdomen. Apparently it must have been felt by pelvic examination although no statement is made to that effect. If that is so, it is quite a sizable tumor—extending from the left upper quadrant to the pelvis.

The laboratory work is of little help and I think we shall have to depend to a large extent on what the radiologist tells us.

DR. AUBREY O. HAMPTON I think this is the largest tumor I have ever seen if it is a tumor. The diaphragm is high on both sides. The mass is so large that the shadow extends beyond this

17-inch film The left kidney is here The outline is not very distinct, but the calyces and the kidney pelvis appear normal There is no pressure on the inner aspect of the kidney

DR KRANES Can you see the outline of the kidney?

DR HAMPTON I cannot see it in any of these films, but all the films are not here

DR KRANES I was relying on that a good deal

DR HAMPTON The kidney outline here is very indefinite I do not know whether you can rely on this shadow, but you can be sure of the fact that the calyces and pelves are normal, and I cannot imagine a tumor of this size primary in the kidney without deformity of the kidney pelvis or calyces I think you can rule out kidney tumor by x-ray The fundus of the stomach is on the right side of the abdomen opposite the eleventh rib The stomach is displaced backward behind the right side of the spine, and in the lateral view the lower margin of the mass slants forward and downward It is not round It is more pointed below I think you can see it in these films

DR KRANES What about the statement that all the bones appeared older than they should?

DR HAMPTON That is true All the epiphyses are closed, and she was only nineteen they should not be closed until twenty-one

DR KRANES Which epiphyses?

DR HAMPTON The epiphyses of the femurs and those of the crests of the iliums

DR KRANES Do you think the dragging caused by the increased weight could have closed them?

DR HAMPTON I do not know the significance of those findings in this case

DR HORACE K SOWLES Is there anything significant about the direction of the displacement of the stomach

DR HAMPTON Yes, the fundus is displaced markedly to the right and backward

DR SOWLES Does that influence the x-ray point of view?

DR HAMPTON Yes, it does

DR KRANES In commenting on the physical examination I meant to discuss the implication, brought about by the statements about the hair growth and masculine distribution of pubic hair, that this tumor was having a masculinizing effect I am inclined to discount that since it seems to me from the description that it is no more than one would expect in many women without detectable endocrine disturbances There may, of course, be some disordered function which our present methods do not detect, but I cannot be impressed by this little evidence Furthermore,

if this were a masculinizing tumor of some sort, one would expect that the menstrual periods would have been disordered and that the 17 ketosteroid determination would have been elevated

So far as the differential diagnosis goes, there are not very many cystic tumors of the abdomen which reach this size, so that the diagnostic possibilities are immediately narrowed down The most probable cystic abdominal tumor in the female is an ovarian cyst, to which, however, there seem to be several serious objections The first is that the symptoms began in the left upper quadrant. If we pay any attention to the history,—and it seems to me we must,—I cannot see how an ovarian tumor could cause symptoms of this sort in the left upper quadrant even though it may have had a long pedicle Furthermore, I should expect some menstrual disturbances if this patient had had an ovarian tumor of this size Another thing I cannot explain on this basis is the downward displacement of the kidney Could that possibly occur with an ovarian tumor, Dr Hampton?

DR HAMPTON I have seen a retroperitoneal dermoid cyst of the ovary at the kidney level. I do not remember whether it was above or below

DR KRANES What puzzles me is that it is hard to see how an ovarian tumor could displace the kidney downward

DR HAMPTON Nor could it displace the fundus of the stomach

DR KRANES Apparently there is something about the displacement of the stomach that I do not understand

Another possibility in that location, and with downward displacement of the kidney, is an adrenal tumor But, I have never seen or heard of an adrenal tumor reaching this size or becoming cystic If such a tumor does either of these things, I am not familiar with it Statements about abnormal hair growth do not impress me in trying to support such a diagnosis

It might be a large dermoid cyst I do not believe one would get a fluid wave in a dermoid cyst, however The contents of a dermoid cyst after removal usually solidify, they are liquid *in situ*, but I do not think one would get a fluid wave. Furthermore, one should, I think, have seen some calcification by x-ray in a dermoid cyst of that size I cannot exclude it, but because there is no calcification and because of the presence of a fluid wave I think that a dermoid cyst is unlikely

Dr Hampton said he could definitely exclude a large cyst of the kidney, so I shall not discuss that any farther

The two possibilities that I should consider are,

first, a cyst of the spleen and, second, one of the mesentery or omentum. I do not know how to differentiate them, except to say that this patient's symptoms began in the left upper quadrant and that the whole story was essentially confined to that area. It would seem to me that if this were a mesenteric or omental cyst the symptoms would more likely have been in the midpart of the abdomen or lower. The displacement of the splenic flexure and kidney downward is more in keeping with a large cystic tumor originating in the left upper quadrant, most likely in the spleen. As I say except for the fact that all the symptoms were confined to the left upper quadrant, I do not see

On physical examination it was quite obvious to me that the tumor was not ovarian. We could tell that it did not extend into the pelvis but seemed to fill the whole abdomen, obviously rising from beneath the left costal margin. We therefore made a long incision and took the cyst out. In the illustration (Fig. 1) one can see the lower pole of the spleen on the left hand side where the hemostats are. Beneath that are the vessels of the pedicle. That is the point that Dr. Hampton has been describing. The x-ray films seemed to show that it ended in a rather pointed prominence which slanted down into the abdomen. The vessels of the pedicle were low. After they were freed the cyst came out easily.

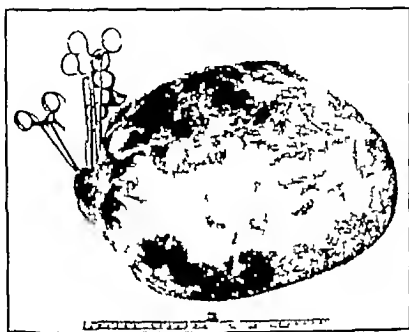


FIGURE 1. Splenic Cyst

The grayish mottled areas on the surface are foci of fibrosis.

how one could distinguish between that and a mesenteric or omental cyst. Because of that fact however, I shall make a diagnosis of cyst of the spleen.

DR. RICHARD SWEET: I was not impressed by a fluid wave on physical examination, although I did think it was a cystic tumor. Several of the other surgeons were convinced that it was a solid tumor. Having seen with Dr. Daniel F. Jones two other cases of cyst of the spleen with the absolutely characteristic findings which this girl showed including those found in the x-ray films and on physical examination of the abdomen, we made a preoperative diagnosis of cyst of the spleen.

CLINICAL DIAGNOSIS

Cyst of the spleen

DR. KRANES'S DIAGNOSIS

Cyst of the spleen

ANATOMICAL DIAGNOSIS

Cyst of the spleen.

PATHOLOGICAL DISCUSSION

DR. BENJAMIN CASTLEMAN: This cyst weighed 17 kilograms (38 pounds) and is the largest of the four splenic cysts that we have had here. It was unilocular and filled with hemorrhagic, somewhat chocolate-colored, thin fluid. The splenic tissue was stretched thinly over the cyst, but was otherwise normal. On microscopic examination we could not find any epithelial lining, and from the reports in the literature* only a few show such a lining. Of the other three cysts of the spleen that we have seen one was a dermoid cyst lined with stratified squamous epithelium, the other two showed contents similar to those in this case and had no epithelial lining, just connective tissue. The etiology of these cysts of the spleen is unsettled: some are angiomatous and are true neoplasms, a few are probably congenital, but most people believe that the large proportion of them are traumatic.

*Fowler, R. H. Cystic tumors of the spleen. *J. Intern. Med.* 46: 249, 1913-14.

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PROLONGED RESIDENCIES THEIR EFFECT ON HOSPITALS

THE first of the problems raised by prolonged residencies—that of their effect on medical education—was discussed in the June 13 issue of the *Journal*. The second—that of their effect on hospitals and the young physicians who must go through the prolonged and rigorous training—is covered in the following paragraphs, the third—that of their effect on the practice of medicine—will be considered in a subsequent issue.

By enrolling the young medical graduate for five years at such a crucial period of his development the hospitals assume a tremendous responsibility. This period of training must be made a well-rounded educational experience, and clinical duties must be limited sufficiently to make this possible.

Practical experience must be supplemented by additional, specialized education in basic science, and if the medical schools fail to co-operate, the hospitals must become little universities in themselves. Few, if any, not directly associated with medical schools are in a position to meet such a demand at the present time. Even with maximal collaboration the brunt of the burden must remain with the hospitals. Since it cannot be too often re-emphasized that nothing will go farther to assure the well-being of the patient than the maximum level of competence in the resident staff, this growing function of the hospital as an educational institution must be called to the attention of the community in order that financial support will be forthcoming. Within the hospitals themselves staff-members and boards of trustees must be convinced of its importance and persuaded to make the sacrifices that will be necessary to make it effective.

When men are held for so long a period on an active service they gain clinical experience at a rapid rate. To be of real developmental value the experience must be coupled with a progressive increase in responsibility and, on the surgical services, with an opportunity to develop increasing technical skill. A greater proportion of operative procedures must go to the residents, and the visiting staff must gradually assume more of a preceptorial attitude and restrict itself sharply to the more difficult procedures. The transition period will be difficult, visiting staffs may begin to seem cumbrously large, and it will be hard to provide fair opportunity for all. The junior visiting staff is particularly in danger of being squeezed out from above and below.

On the financial side the increase in cost to the hospitals will be considerable. Quarters must be enlarged, more men must be fed, and unless resident salaries are appreciably increased, some of the most promising men will be automatically eliminated. Provision for married residents should be most seriously considered.

Still more difficult is the problem of financing

the men during periods when they have no clinical responsibilities, that is, when they are extending their acquaintance with bacteriology, pathology or biochemistry. They will be too numerous and their periods of availability will be too short to make them serviceable to the routine hospital laboratories, which are already only too often over crowded. They will require active tutorial supervision, and funds will be needed both to pay the tutors and to provide fellowships for those who could not otherwise manage this essential year.

Because of their necessary relations and responsibilities to the communities that support them, hospitals must give serious consideration to the establishment of basic internships. These should not only be suitable as foundations for further specialized training but also fit the men for general practice. The possibility of properly selecting from students still untested by clinical responsibility the men who will make in five years time the best surgeons or the best internists is dubious. Moreover, it is also doubtful if at such a period in their careers students should be asked to make a choice that can be revoked only with difficulty. With so-called "straight internships" a start in the wrong direction will be almost prohibitively time-consuming. Yet many of the present leaders in the profession required two or more years of hospital experience before they were able to decide in which branch of medicine they belonged.

One more danger must be cited. With five years residence in a single institution, with the inevitable selection of the majority of the visiting staff from the products of its own resident system and with the appointment of residents largely limited to the students who have worked on the wards, there is peril of intellectual inbreeding. Even at the sacrifice of considerable administrative convenience, every effort should be made to exchange men with other institutions at all levels of training and experience, in order partially to counteract this tendency.

ROBERT THEODORE GUNTHER AND THE HISTORY OF SCIENCE

ALTHOUGH there have been many historians of medicine and various other branches of science, such as mathematics, few men have devoted their lives to the history of science at a whole. In America the outstanding example is Professor George Sartori, of Harvard University, the author of the scholarly three volume *Introduction to the History of Science* now complete up to the fourteenth century, with a final volume nearly ready for the press. In addition, he has edited over thirty volumes of the periodical *Isis* the leading journal in its field. Sartori's scope knows no bounds in science, for his writings cover all science from astronomy to zoology. His encyclopedic mind can only be compared to those of the great humanists and scholars of the Middle Ages and Renaissance, who took all knowledge as their province. Others, however, have toiled profitably in a narrower field, and such a one was Robert Theodore Gunther, through whose death on March 9 the history of science loses an active worker.

Gunther was the eldest son of a distinguished father, Albert C. L. Gunther who came to England from Germany on a visit in 1856. He viewed the large but unsystematized collection of zoological material at the British Museum and, expressing the need for organization, was invited to begin work at once. His efforts were so appreciated that he soon was made director of the Zoological Department. He worked in the museum steadily and almost daily from 1856 to 1895 under his supervision the collections more than doubled in size. Gunther became the leading systematic zoologist of his day recognized throughout the world as eminent in his field. To this great scientist and to Roberta McIntosh of St. Andrews Scotland, a son, Robert, was born, who, in turn was to distinguish himself in quite another field of science.

Born in 1869, young Gunther was educated at University College in London and later at Mag,

dalen College in Oxford. In the latter institution, as fellow and tutor, he served all his mature years. Oxford became his home, and his work centered around the great university. During the World War he began collecting, cataloguing and photographing the numerous scientific instruments scattered in the various colleges and museums in Oxford. A number of early catalogues were published, but his most enduring work was not inaugurated until 1923, when he published the first of a long series of books on *Early Science in Oxford*. The last, Volume XIII, was issued in 1938. A companion volume, *Early Science in Cambridge*, was issued in 1937, *Early Medical and Biological Science* (1926) was an extract of particular medical interest from the larger series on Oxford. The works were all privately printed for subscribers by the Oxford University Press and are splendid examples of fine typography. The whole series was a monumental accomplishment—factual, detailed, extensively illustrated, scholarly and in every way a credit to the history of science. No detail was too small to be noticed by Gunther, who turned out from the dusty corners of the halls, museums and libraries of Oxford a surprising amount of interesting and informative material. Of particular importance is the printing from manuscript of the *Transactions of the Philosophical Society of Oxford, 1683-1690*, in Volume IV of the Oxford series, Chaucer's *Treatise on the Astrolabe* in Volume V, a facsimile and translation, by K. J. Franklin, of the *Tractatus de Corde* by Richard Lower in Volume IX, and numerous works of Robert Hooke, including *Micrographia*, in Volume XIII. Books of particular interest to medical men are, in addition to Lower's *Tractatus de Corde*, *The Biological Sciences* (Volume III) and *Oxford Colleges and Their Men of Science* (Volume XI). Gunther wrote and edited many other books, including *Early British Botanists*, *The History of the Daubeny Laboratory*, *The Architecture of the Hospital of St. John* and a series of smaller volumes entitled *Old Ashmolean Reprint*.

In addition to the books, of which the list given above is not by any means complete, Gunther worked for years to establish a museum in Ox-

ford worthy of the history of science. The natural site was the Old Ashmolean, a beautiful building with a superb portal designed by Christopher Wren. After considerable opposition this building was secured as a permanent science museum, and it now contains the great collection of scientific instruments found in Oxford by Gunther and those given to the university by Lewis Evans. In May, 1927, the building was opened. A fine memorial window was added to commemorate the men of science who were connected with the original foundation of the museum—Tradescant, Plot, Ashmole and Wren.

An admirable chance to display these scientific instruments was taken advantage of by Sir William Osler in the summer of 1919, when he gave his presidential address before the Classical Association at Oxford on "The Old Humanities and the New Science." Gunther spread his treasures before the eyes of the classicists in the picture gallery of the Bodleian Library, and before his friends in quite another field of endeavor, with a light touch Osler dilated on the historical value of these complicated instruments. That he succeeded in interesting the classicists goes without question, but a large share of the success of the exhibit depended on Gunther. A catalogue of the exhibition was issued at the time, and reference to the event was recalled by Harvey Cushing in the American edition of Osler's address, published in 1920.

Gunther, in general, was a lone worker and never a type of individual who could be popular with his fellow men. He wrote and edited almost continuously, most of his books were issued from his own home on Folly Bridge in Oxford. He was, however, a prompt and business-like correspondent, and a loyal friend to all those who saw the value of his work. To others, and there were unfortunately a good many of them, he seemed rather distant and diffident. His name will go down in history as that of a man who made a definite contribution to the history of science, for he unfolded for his contemporaries, and those that will come after them, the history of the development of science in Oxford as no one had done before him.

MEDICAL EPONYM

CARREL DAKIN SOLUTION

Alexis Carrel, of the Rockefeller Institute, and Henry C Dakin, of the Herter Laboratory, New York City, while working in the laboratories at Compiègne, supported by the Rockefeller Institute for Medical Research and attached to Hospital 21 of the French Army, published the results of their collaboration in 1915. In the *Bulletin de l'Académie de médecine* (74 [3S] 361-368 1915) appears an article entitled *Traitement abortif de l'infection des plaies* [The abortive treatment of infected wounds]. The author is given as Alexis Carrel, national correspondent of the Academy of Medicine, with the collaboration of Dakin, Daufrèsne, Dehelly and Dumas. A description of the technic of the use of this solution is given. A translation of their conclusions is as follows:

It is thus possible to sterilize infected wounds and to heal them like aseptic wounds. It would seem that the abortive treatment of infection may considerably hasten the healing of an infected wound and prevent the greater part of those complications which cause death, the amputation of extremities and other more or less severe crippling.

Dakin published an article "On the Use of Certain Antiseptic Substances in the Treatment of Infected Wounds" in the *British Medical Journal* (2 318-320, 1915). He gives full directions for preparation of the solution and concludes:

It has been possible to prepare a simple hypochlorite mixture which maintains approximate neutrality under all conditions, is practically non-irritating and which, when properly applied has given most encouraging results in the antiseptic treatment of wounds.

R W B

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PYELITIS IN PREGNANCY

Mrs H., a twenty eight year old primipara twenty five weeks pregnant came into the office on April 10 1939, complaining of right sided pain. The right kidney was tender, the temperature was 101°F, the pulse 120. A diagnosis of pyelitis

was made, and the patient was advised to enter the hospital.

The family history was negative. The patient's past history included "cystitis," measles and chicken pox. She had undergone a tonsillectomy and an appendectomy. In 1938 she had been hospitalized for three days with a carbuncle. Catamenia began at thirteen, were regular with a twenty eight-day cycle and lasted three days. The last period was October 16, 1938, making the expected date of confinement July 23. She was first seen in February 1939, at which time a physical examination was entirely normal.

The patient was admitted to the hospital on April 11 with a temperature of 103°F and a pulse of 140. On April 12, following a chill, the temperature rose to 105°F and the pulse to 130. The next day the temperature rose to 105°F from a low of 98. A catheter specimen showed *Bacillus coli* on culture. Blood examination on April 14 showed a red-cell count of 2,820,000 with 55 per cent hemoglobin. She was started on iron therapy.

On April 15 the urine was macroscopically bloody and an intravenous pyelogram showed that excretion from the right kidney was slow, the best plate occurring two hours after injection. A consultation was held with a urologist. The question of sulfanilamide therapy was raised but because of the anemia it was thought to be contraindicated. On April 17 when the temperature was coming down—the highest point on that day being 100°F—and the bloody urine had ceased a cystoscopy was performed and the right kidney catheterized, a No. 9 catheter being easily placed in the renal pelvis. The bladder was free from inflammation. The residual urine from the right kidney totaled 22 cc. The kidney pelvis was washed out with boric acid solution and left full of the solution. On April 19 the temperature rose to 102°F but came down to normal eight hours later, where it remained until discharge on April 29. A blood examination on April 28 showed the red-cell count to be 3,690,000 with a hemoglobin of 69 per cent.

The pregnancy from then on was normal and uneventful. There was no recurrence of the pyelitis. The patient was delivered on July 19 and made an uneventful convalescence.

Comment. This case well illustrates the possible severity of an acute attack of pyelonephritis. It also shows the attitude of the consultant toward the use of sulfanilamide in the face of the anemia; it was believed unwise to resort to chemotherapy.

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

The cystoscopy was done in order not only to wash out the kidney pelvis but also to rule out any bladder disease in the face of occult blood in the urine. It is not correct to claim that the kidney lavage cured this patient. It is perfectly fair to say that it helped her, but one cannot deny that sulfanilamide might have resulted in just as spectacular a recovery.

Occult blood in the urine demands diagnosis. Sometimes the bleeding comes from congestion of the bladder itself. In this case the bladder was normal and the bleeding came from the acute infection in the renal pelvis. If sulfanilamide becomes a household remedy, some cases of renal disease that can be diagnosed only by intravenous pyelograms, cystoscopy and catheterization of the renal pelvis will be overlooked. The striking cures that will be seen following its use must not interfere with consultations with well-trained urologists when hematuria exists.

MISCELLANY

RESPONSIBILITY FOR MEDICAL CARE OF THE INDIGENT SICK

At the 1938 Massachusetts Conference of Social Work the Committee on Next Steps in Medical Care* considered the medical care of the indigent, and adopted the following principles:

1 An indigent person is defined as one unable to provide for himself the ordinary necessities of life (food, shelter, clothing and so forth), including medical care when ill.

2 A medically indigent person is one who is ordinarily self-supporting at a subsistence level but unable to pay for medical care when ill.

3 The committee subscribes to the principle that the medical care of the indigent is a relief problem and that, as such, it is the final responsibility of government. Voluntary hospitals and health agencies should continue to care for members of this group so far as their funds will permit, but to the extent to which voluntary resources are inadequate, medical care for this group should be provided from tax-supported funds.

4 The committee believes that the medical care of the medically indigent is also a relief problem. It believes that medical care of persons in this group is the joint responsibility of voluntary and public agencies and that the decision as to whether the responsibility is private or public should be made in each individual case by mutual agreement after adequate social investigation.

5 The committee further subscribes to the principle that the medical care of persons in the low-income brackets, at or above the level of self-support, is an insurance problem, which may be solved through the

development and operation of voluntary prepayment insurance plans. Should the development of such plans not constitute a sufficiently wide or adequate coverage of members of this large group, the alternative may lie in compulsory insurance, similar in operation to unemployment compensation under the Social Security Act.

At the conference held on November 8, 1939, the committee restricted its deliberation to the medically indigent, that large group of the population ordinarily self-supporting but unable to pay for medical care when ill. The following additional statement of principles was formulated by the committee and approved by the conference:

1 The medical care of the medically indigent is the joint responsibility of tax-supported and voluntary agencies. The medical needs of this otherwise self-supporting group are not being met. Provision of better medical care for these individuals is the common goal of voluntary agencies, the medical profession and public officials concerned with health and welfare. The achievement of this common purpose requires the joint effort and sincere co-operation of all concerned to develop a complete well rounded program.

2 The decision as to whether a tax supported or voluntary agency should bear the cost of this care should be made by persons competent to evaluate the medical, social and economic aspects of each case. This decision might well be based on the principle that the care of an illness constituting only a temporary disability belongs to the voluntary agency, and the care of an illness which produces disability of long or permanent duration falls more logically within the responsibility of the tax supported agency. This principle should be interpreted to designate not the place of treatment but rather the responsibility for the cost of care.

3 The maintenance of this service would entail cost and personnel not at present supplied through either governmental or voluntary channels.

4 The committee therefore recommends the formation of a permanent committee to plan for the co-ordination of medical services among the governmental agencies, the voluntary agencies and the medical profession, to the end that adequate medical care may be available to all these groups.

TUBERCULOSIS IN ADOLESCENTS

For the past few years vast numbers of school children and college students have been tested with tuberculin and the x ray. Out of these studies have come some definite conclusions pertaining to the incidence of tuberculosis in youth. Little has been reported, however, about the outcome of cases discovered in mass-testing programs, doubtless because sufficient time has not elapsed in most of these studies to justify an appraisal of the results of treatment. In Massachusetts, where pioneer work in mass case finding was begun more than a decade ago, Chadwick and Evarts (Treatment of pulmonary tuberculosis in adolescents *Am Rev Tuberc* 41:307-318, 1940) have attempted to evaluate the results of various types of treatment and the fate of tuberculous adolescents. A summary of their findings follows:

The case fatality rate of pulmonary tuberculosis cannot be determined unless we follow a large number of cases from the time diagnoses are made until the death of all the individuals concerned. Unlike acute communicable diseases, tuberculosis is a disease of long duration. It may

*The members of the committee are: Frank E. Wing, chairman; Mrs. Selma Bridges, Dr. Allan M. Butler, Edith R. Canterbury, Mary Alma Cotter, Frank Goodhue, Dr. Alton S. Pope, Arthur J. Strawson and Margaret H. Tracy, secretary.

be acute but is more often chronic, with periods of quiescence followed by exacerbations, and may so continue for years.

We may, however, measure the effect of treatment by checking against each other groups of patients of similar age who have been treated by different methods for the same length of time. The authors studied the records of 745 patients who had parenchymatous pulmonary tuberculosis at the time they came under observation. Most of them received treatment in some sanatorium. These were divided into three groups according to the time they had been under observation—namely Group A, from 5 to 10 years; Group B from 3 to 5 years; Group C, less than 3 years.

The type of treatment received by these groups, further divided according to stage of disease, was found to vary during the past ten years. There was a trend away from routine bed-rest treatment for a preliminary try-out period to be later supplemented by pneumothorax if the disease were not controlled. The present practice is to institute pneumothorax promptly. The minimal cases of Group A admitted to Middlesex County Sanatorium (prior to 1934) received no immediate treatment with pneumothorax; 40 per cent of Group B were given pneumothorax promptly; of Group C, 87 per cent were given pneumothorax soon after admission.

The conclusion of the authors, based on their own studies and supported by those of others, are that the mortality from tuberculosis in adolescents is high and treatment very discouraging. Morgan, reporting in 1938 on 320 cases of boys and girls ten to eighteen years of age treated in a sanatorium prior to 1933 found that 62 per cent were dead, 14 per cent under treatment, 17 per cent well and 7 per cent not located. The treatment in this series consisted of prolonged bed-rest supplemented by pneumothorax in a few cases, and then given only after a period of waiting. Zacks recently studied 186 cases treated in sanatoriums and observed for a period of about four years. Those that had routine sanatorium treatment only showed a mortality of 30.9 per cent for boys and 34.4 per cent for girls; those that had sanatorium treatment plus pneumothorax showed a mortality of 8.5 per cent for boys and 23.1 per cent for girls. In the authors' group observed for five to ten years the deaths were 4.8 per cent for the boys and 27.5 per cent for the girls. Half these cases were given pneumothorax.

Pneumothorax should be instituted as soon as possible after diagnosis is made even in the minimal cases, and this should be supplemented by pneumonolysis if satisfactory collapse is prevented by adhesions that can be cut. Ineffective pneumothorax should be abandoned, and some other surgical collapse procedure carried out. When a satisfactory collapse with pneumothorax is obtained, it should be continued for a minimum of three years, and for five years in the cavity cases.

Patients discharged from the sanatoriums should be considered as having completed only the first phase of treatment and should return at frequent intervals for consultation during subsequent years. If they are pneumothorax cases, they will have their refills and in any event their condition will be rechecked. A roentgenogram taken every three months will be the most important means of following the course of the disease. If the old lesion shows reactivation, or a new one appears, prompt readmission and suitable treatment should be instituted.

The evidence available in this and other studies indicates the ineffectiveness of bed-rest treatment alone in staying the progress of tuberculosis in adolescents.—Reprinted from *Tuberculosis Abstracts* June 1940.

MAINE NEWS

ANNUAL MEETING OF THE MAINE MEDICAL ASSOCIATION

The program of the annual meeting of the Maine Medical Association, to be held June 23, 24 and 25 at Rangeley Lakes, is as follows:

MONDAY, JUNE 24

MORNING SESSION—Conferences.

Ophthalmology W. H. Chaffers, M.D., Lewiston, chairman.

1. Some Oculomotor Disturbances. David G. Cogan, M.D., Cambridge, Massachusetts.
2. The Diagnosis and Treatment of Some Corneal Conditions. Trygve Gundersen, M.D., Boston.

Pathology Mortimer Warren, M.D., Portland, chairman.

1. Discussion of Laboratory Methods in Tuberculosis Work. Lester Adams, M.D., Hebron.
2. Discussion of Medical Mycology. Leon Balaban, M.D., Portland.
3. Demonstration of specimens, slides and case reports.
4. Consideration of the advisability of forming a state association of pathologists.

Surgery Harrison L. Robinson, M.D., Bangor, chairman.

Round-table discussion of the "acute abdomen" and other surgical emergencies.

Anesthesia Maurice E. Lord, M.D., Skowhegan, chairman.

1. Anesthesia from the Surgeon's Viewpoint. G. E. Young, M.D., Skowhegan.
2. Anesthesia Then and Now. S. E. Sawyer, M.D., Lewiston.
3. Why Should the Physician Anesthetist Be Employed as Chief of the Anesthesia Department in Every Hospital? E. M. Fuller, M.D., Bath.
4. Anesthetic Emergencies, Complications and Treatment. Eugene Brown, M.D., Bangor.
5. Anesthetic Risks with Reference to Choice of Agent. Gilbert Clapperton, M.D., Lewiston.
6. Pentothal Sodium: Its field of usefulness. R. M. Towell, M.D., Hartford, Connecticut.
7. Anesthesia and Disturbed Physiology. Meyer Saklad, M.D., Providence, Rhode Island.

Medicine James W. Reed, M.D., Farmington, chairman.

1. Diabetes: The problem from the standpoint of the internist. Sven M. Gunderesen, M.D., Hanover, New Hampshire.
2. Diabetes: The problem from the standpoint of the surgeon. Harry Brinkman, M.D., Wilton.
3. General discussion directed by E. R. Blausdell, M.D., Portland.

Obstetrics R. B. Moore, M.D., Portland, chairman.

1. Indications for and Some Methods of Induction of Labor. Leroy C. Gross, M.D., Lewiston.
2. Routine Episiotomy and Use of Low Forceps in Primiparas. Clarence Emery Jr., M.D., Bangor.
3. Management of Posterior Positions. E. A. McLean, M.D., Portland.
4. Discussion of general obstetrical problems.

Pediatrics A W Fellows, M.D., Bangor, chairman

- 1 The Newer Remedies and the Administration of Fluids F P Webster, M.D., Portland
- 2 Symptomatic Treatment. C S Bauman, M.D., Waterville.
- 3 Immunization and Specific Serums Alice S Whittier, M.D., Portland
- 4 General Principles and Technic of Medication A W Fellows, M.D., Bangor

AFTERNOON SESSION—Clinicopathological Conference Julius Gottlieb, MD, chairman.

Discussion Dr Reginald Fitz, M.D., Boston

TUESDAY, JUNE 25

MORNING SESSION—Conferences

Medicolegal Medicine W S Stinchfield, M.D., Skowhegan, chairman

Timothy Leary, M.D., Boston, and Attorney General F U Burkett, Portland, will address this meeting

Nervous and Mental Diseases F C Tyson, M.D., Augusta, chairman.

- 1 Psychotherapy in General Medical Practice M R Kaufman, M.D., Boston.
- 2 The Rorschach Test in Diagnosis of Psychoses and Psychoneuroses A A Weil, M.D., Augusta
- 3 Use of Intelligence Tests in Diagnosis of Psychotic Patients. G R Foster, Ph.D., Augusta
- 4 Summary of Two Years' Experience with Insulin in the Treatment of Certain Psychoses E. A Blank, M.D., Bangor

Medicine F A. Winchenbach, M.D., Bath, chairman.

Head Injuries The responsibility of the general practitioner, initial treatment, differential diagnosis, treatment of non surgical groups, treatment of surgical groups, prognosis A panel discussion by Drs M. E. Joss, Richmond, G A. Gregory, Boothbay, W B Mitchell, Wiscasset, W V Cox, Lewiston, and H. E. MacDonald, Jr., Portland

Surgery C H. Jameson, M.D., Rockland, chairman.

- 1 Estimating the Surgical Risk. E E O'Donnell M.D., Portland.
- 2 Pitfalls of Surgery E H. Rusley, M.D., Waterville.
- 3 Choice of Anesthesia. Gilbert Clapperton, M.D., Lewiston.
- 4 Postoperative Management. W V Cox, M.D., Lewiston.
- 5 Safeguarding the Surgeon. Attorney H E Locke, Augusta

Ear, Nose and Throat F T Hill, M.D., Waterville, chairman.

Recent Advances in Otolaryngology

- 1 The External Ear Pierre Provost, M.D., Augusta.
- 2 The Middle Ear and Mastoid. W A. Ellingwood, M.D., Rockland.
- 3 Meniere's Disease. P J Mundie, M.D., Calais
- 4 Chemotherapy in Sepsis in Otolaryngology E. R. Irgens, M.D., Waterville.
- 5 Paranasal Sinuses R. M. McQuoid, M.D., Bangor
- 6 Allergy in Otolaryngology C H Gordon, M.D., Portland.

7 The Pharynx and Larynx. G O Cummings, M.D., Portland

8 Neoplasms Involving the Ear, Nose and Throat A C Hurd, M.D., Gardiner

Gynecology A P Leighton, M.D., Portland, chairman.

- 1 Eclampsia and Its Treatment. W F W Hay, M.D., Portland
- 2 Vaginal Discharges Their significance and treatment. T C Bramhall, M.D., Portland.
- 3 Postclimacteric Bleeding R L Reynolds, M.D., Waterville.
- 4 Menorrhagia and Metrorrhagia. M F Ridlon, M.D., Bangor

AFTERNOON SESSION—Scientific Symposium.

- 1 President's Address
- 2 Compound Injuries to the Hand. H C. Marble, M.D., Boston.
- 3 Obstetric Problems P L. B. Ebbett, M.D., Houlton
- 4 Traumatic Intracranial Hemorrhages, with Demonstration of Brains Timothy Leary, M.D., Boston

EVENING SESSION—Banquet.

Quackery in Medicine. Morris Fishbein, M.D., Chicago

ATMOSPHERIC RAGWEED POLLEN SURVEY FOR 1939

In Portland, glass slides were exposed for fifty consecutive days on the roof of the Maine General Hospital, under the supervision of the pathologist, Dr Mortimer Warren. The highest count was on September 2, the number of "hay-fever days" (count of 25+) was ten, the pollen index (Durham) was 14. In Camden the receiving station was placed at the CCC camp, under the supervision of the Maine Health Bureau. The fifty-day season, from August 10 to September 28, showed the highest count on September 3, the number of "hay-fever days" was seventeen, the pollen index was 26. After a re-check Mr O C Durham stated that the Camden figures were higher than anything he had had from Maine. In answer to the question as to how to account for this, Dr C. B. Sylvester, who is in charge of the Pollen Survey, stated that more ragweed was found in the vicinity of the CCC camp than anywhere else around Camden and that the soil should be planted with some worthwhile cover, otherwise ragweed would flourish unbroken turf does not grow ragweed.

RECOMMENDATIONS OF THE ADVISORY COMMITTEE ON SYPHILIS CONTROL

This committee has recommended that a uniform system of records be adopted in all treatment clinics and that a duplicate copy be filed at the office of the Bureau of Health. It also recommends that drugs distributed by the Bureau of Health to physicians and clinics for the treatment of syphilis be limited to the following preparations: mercury cyanide, sulfarsphenamine, Tryparsamide, bismuth subsalicylate in oil, Bismarsen, distilled water, Mapharsen and neoarsphenamine.

In going over the records of the bureau a 12 per cent increase in blood examinations was noted during the fiscal year—a hopeful sign. There are at present twenty-nine clinics in the following cities: Augusta, Bangor, Bath, Belfast, Biddeford, Bingham, Calais, Danforth, Eastport, Ellsworth, Grand Isle, Guilford, Houlton, Island Falls, Lewiston (2), Millinocket, Old Town, Portland (3), Presque Isle, Rockland, Rumford, Sanford, Skowhegan, Waterville, Wilton and Winthrop.

CORRESPONDENCE

DEPRIVATION OF LICENSES

To the Editor The license of Dr Joseph D Beuparant, 528 Eastern Avenue, Fall River Massachusetts, was revoked by the Board of Registration in Medicine on June 6 because of conviction in court of abortion and that of Dr James B. Ryan, 53 Maple Street, Easthampton Massachusetts, was suspended on the same date because of drug addiction and violation of the Harrison Narcotic Law

STEPHEN RUSHMORE, M.D., Secretary
Board of Registration in Medicine.

State House,
Boston.

REPORTS OF MEETINGS

EDWARD K. DUNHAM LECTURES

The Dunham Lectures at Harvard Medical School for 1940 were delivered by Dr S. Walter Ranson professor of neurology and director of the Institute of Neurology Northwestern University Medical School Chicago.

The first lecture on March 4 was concerned with "The Hypothalamus and the Sympathetic Nervous System." In experiments on cats the hypothalamus was stimulated a procedure which resulted in an elevation of blood pressure, an increase of the rate and depth of the respirations, dilatation of the pupils and an increased bladder tension. All except the last phenomenon which must be regarded as parasympathetic, were held to result from stimulation of the sympathetic centers. Accurate localization of the stimulus demonstrated that the best effect was obtained from sites in the lateral areas of the hypothalamus and around the fornix, but not in the internal capsule. The bladder contraction mechanism was further localized near the anterior commissure. The path of the fibers was considered to descend through the central gray matter and tegmentum of the midbrain and the anterolateral part of the cervical cord.

In an attempt to determine the role of the hypothalamus in the regulation of body temperature, bilateral lesions were placed in various parts of the hypothalamus in cats and tests were subsequently made of their ability to withstand environmental heat and cold. In other experiments localized heating with a high-frequency current was used to locate the part of the brain which is specifically responsive to heat and presumably activated by the warmth of the blood when the temperature of the body rises too high. Dr Ranson concluded that there are two thermoregulatory centers at the base of the brain. In the preoptic and subpreoptic regions is a center which is sensitive to heat and prevents overheating by activating a more caudally situated panting center. The pathway connecting the heat sensitive center with the panting center runs through the lateral hypothalamus. The center which by conserving body heat prevents chilling is coextensive with the sympathetic center in the hypothalamus. Large bilateral lesions in the caudolateral part of the hypothalamus interrupt the descending pathway from both these centers and result in persistent lack of ability to adjust to both heat and cold. Medially placed lesions had very little effect on temperature regulation.

In considering the significance of these findings for man Dr Ranson reminded his audience that the only difference in man is his ability for rapid loss of heat through sweating his production and maintenance of

heat are essentially the same as those for animals. Work on monkeys indicated that the hypothalamic centers are essentially the same as those in the lower animals, at least so far as the center for the conservation of heat is concerned.

As to how indispensable such a hypothalamic temperature regulating center is, Dr Ranson stated that although some control exists in the spinal animal, such preparations cannot respond as well to sudden marked changes of temperature as they can to slow slight changes.

In conclusion Dr Ranson stated that the central control for the sympathetic nervous system lies in the caudolateral areas of the hypothalamus at the level of the tuber cinereum and mammillary bodies and integrates the system into purposeful patterns. Thus, on exposure to cold, there is a resultant vasoconstriction, fluffing of the hair and increased heat formation, all of which can be prevented by lesions suitably situated.

On March 6 Dr Ranson discussed "Hypothalamico-hypophyseal Relations." Since the functions of these two organs that are so closely related anatomically have been associated, and since Wislocki has shown a lack of blood drainage from the pituitary gland to the hypothalamus, an attempt was made to determine the nature of the interrelation.

It is known that the nerve fibers connecting these two structures form two bundles, called the supraoptic-hypophyseal and tuberohypophyseal tracts. Numerous experiments revealed that it was only lesions of the former fibers which caused diabetes insipidus and also resulted in atrophy of the supraoptic nucleus and neural lobe of the hypophysis. The resultant disease had two phases, a temporary one for four or five days and the permanent stage developing about a week later. The polyuria regularly preceded the polydipsia.

In the rhesus monkey it was demonstrated that the severity of the diabetes insipidus was proportional to the amount of the neurohypophysis which was left intact above the level of the transection of the supraoptic-hypophyseal tract in the medial eminence or the neural stalk. Such lesions cause degeneration of the neurohypophysis and of the supraoptic nucleus. Microscopic and macroscopic examinations, as well as hormonal assay and substitution therapy indicate that it is the failure of the neurohypophysis that causes diabetes insipidus, yet a hypophysectomy fails to produce the syndrome. Dr Ranson suggested that the two findings can be correlated by hypothesizing the necessity for leaving the anterior lobe of the pituitary gland intact.

Dr Ranson cited cases of this disease in man studied post mortem in which destruction of the supraoptic nucleus, the supraoptic-hypophyseal tract or the neurohypophysis resulted in destruction of all three members of the closely integrated system.

The speaker went on to discuss the question of the effect of the hypothalamus on the anterior hypophysis. Anatomically few fibers can be demonstrated connecting these regions. Yet hypothalamic lesions may simulate the antidiuretic effect of the anterior lobe of the pituitary gland, although section of the neural stem does not result in hypoglycemia or insulin sensitivity.

In regard to adipogenital dystrophy Dr Ranson indicated that the adiposity may result from a hypothalamic lesion, and the genital dystrophy from the anterior pituitary lesion. In order however to produce obesity in rats, enormous bilateral lesions around the third ventricle were necessary and this condition was even more difficult to produce by hypothalamic lesions in monkeys. The small

est effective lesions were in the ventromedial, the dorso-medial and the arcuate nuclei. No macroscopic effect on the pituitary gland or its stalk was noted, and microscopic studies are not as yet complete. The removal of the hypophysis after a week seemed further evidence that this organ is not necessary for the typical obesity changes.

That the hypothalamus may also have some relation to the gonadotropic hormones was indicated by ventral lesions near the optic chiasm and infundibulum, which resulted in sterility and impotence associated with varying degrees of atrophy of the internal and external genitalia. Those in the largest group were anatomically normal, but failed to exhibit typical estrous behavior. Dr. Ranson concluded that a center of the hypothalamus near the optic chiasm is necessary for the mating reaction in guinea pigs, despite a normal sexual cycle and an intact pituitary gland.

The final paper of the series, on March 8, was concerned with "The Hypothalamus and Behavior." Dr. Ranson alluded to the "sham rage" of Cannon's decorticate cats and to the work of Bard suggesting the need for the posterior hypothalamus for the expression of emotion. It was shown that stimulation of the hypothalamus results in part of the rage pattern—dilatation of the pupils, rapid respiration and elevated blood pressure—while under ether, and the whole response following recovery from anesthesia. Destruction bilaterally, on the other hand, caused somnolence, lethargy and a tendency to catalepsy in cats. The initial somnolence wore off gradually, but there was a persistent lack of motor initiative. The monkeys with such lesions were somnolent but not comatose, they were emotionally stolid. Many of them showed hypothermia, but this was not responsible for the somnolence. One animal showed classic catalepsy.

Lesions of the thalamus, subthalamus and anterior hypothalamus failed to cause somnolence, as did also an interruption of the paths to and from the thalamus and cortex.

As a result of the findings, Dr. Ranson discussed the mechanism of sleep. Although disclaiming knowledge of the mechanism for falling asleep, it was predicted that the means of maintaining a proper balance between the sleeping and the waking states reside in a hypothalamic waking center, independent of the cortex. Evidence pointing in the same direction is found in von Economo's studies of encephalitis lethargica in man. He reported that lesions in the posterior part of the floor of the third ventricle result in somnolence, while lesions situated farther forward, near the globus pallidus, may result in insomnia. The experimental lesions merely serve to reproduce and localize a long known fact and to emphasize the necessity for the integrity of a waking center. The transient character of these manifestations of posterior hypothalamic lesions suggests that despite its great importance, this part of the brain is not the only center for controlling emotional behavior and for maintaining the waking state.

Dr. Ranson stated that tumors of this region in man may cause mania or alternating irritability and unreasonableness with somnolence. Furthermore, operations around the third ventricle have caused lively mania, whereas manipulation of the lateral ventricles or the caudate nucleus results in no such symptoms.

In summary, Dr. Ranson stated that the hypothalamus serves to activate the sympathetic nervous system and to integrate its activity into purposeful patterns, that it maintains the internal secretions of the neurohypophysis and may have some effect on the anterior lobe of the pituitary gland and, finally, that it plays an important part in the expression of emotions and in the maintenance of the waking state.

TUFTS COLLEGE MEDICAL ALUMNI LECTURE

The annual alumni lecture of the Tufts College Medical School was delivered on April 3 by Col. G. R. Callender, director of the Army Medical School, who spoke on "Diarrheal Diseases."

Dr. Callender gave a résumé of the historical background of the diarrheal diseases and then discussed some important aspects of each type of infection. Concerning the epidemiology of amebic dysentery, it was stated that water, since it is rarely a cause, should not be blamed until food, fingers and flies have been eliminated as carriers. Some recent investigations, however, have raised doubt as to the complete efficacy of the usual concentrations of chlorine used in water purification against the cystic form of the ameba.

Dr. Callender contrasted the symptoms and pathological findings in bacillary dysentery with those of the amebic variety. In the latter disease symptoms and laboratory findings are usually minimal until secondary invaders enter the small, scattered ulcers. This superimposed infection, it was pointed out, may be caused by one of the dysentery bacilli. Bacillary dysentery, on the other hand, is an acute infectious disease, with characteristic systemic response and laboratory findings and with widespread pathologic changes of the intestinal tract. The passage of a stool in this disease is painful, whereas there is usually little discomfort in uncomplicated amebic dysentery.

In discussing food poisoning, Dr. Callender stated that some of the staphylococci that are recovered from cases of food poisoning will grow at 8°C., especially if they have been previously warmed for a few hours. Many household refrigerators are operated at even higher temperatures than this. These organisms may also thrive in mediums containing the same ingredients in the same strength as are in the brine used to pickle hams before smoking. The early symptoms in cases of staphylococcal food poisoning are epigastric pain and vomiting, diarrhea may follow later.

No inflammatory exudate has been seen in the diarrhea of the condition which is called "intestinal influenza."

NOTICES

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

| CLINIC | DATE | ORTHOPEDIC CONSULTANT |
|-------------|----------|-----------------------|
| Salem | July 1 | Harold C. Bean |
| Haverhill | July 3 | William T. Green |
| Lowell | August 2 | Albert H. Brewster |
| Gardner | July 9 | Mark H. Rogers |
| Brockton | July 11 | George W. Van Gorder |
| Pittsfield | July 15 | Francis A. Slowick |
| Northampton | July 17 | Garry deN. Hough, Jr. |
| Worcester | July 19 | John W. O'Meara |
| Fall River | July 22 | Eugene A. McCarthy |
| Hyannis | July 23 | Paul L. Norton |

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next written examination and review of case histories (Part I) for Group B candidates will be held in the various cities of the United States and Canada on Saturday, January 4, 1941, at 2:00 p.m. Candidates who successfully complete the Part I examinations proceed auto-

matically to the Part II examinations held later in the year. Applications for admission to Group B Part I examinations must be on file in the secretary's office not later than October 5, 1940.

The general oral and pathological examinations (Part II) for all candidates (Groups A and B) will be conducted by the entire board meeting at Cleveland, Ohio, immediately prior to the 1941 meeting of the American Medical Association.

After January 1, 1942 there will be only one classification of candidates, and all will be required to take the Part I and Part II examinations. For further information and application blanks, address Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

AMERICAN COLLEGE OF PHYSICIANS

The twenty-fifth annual session of the American College of Physicians will be held in Boston with general headquarters at the Hotel Statler on April 21-25, 1941. Dr. James D. Bruce, of Ann Arbor, Michigan, president of the American College of Physicians, will have charge of the program of general scientific sessions. Dr. William B. Breed, of Boston, has been appointed general chairman of the session. He will be in charge of the program of clinics and demonstrations in the hospitals and medical schools and of the program of panel and round-table discussions to be conducted at the headquarters.

SOCIETY MEETINGS AND CONFERENCES

- JUNE 25-27—Medical Library Association. Page 662, issue of May 16.
 JUNE 27—Federation Association of Physicians. The Try-Angle, Greenville.
 SEPTEMBER 2-6—American Congress of Physical Therapy. Page 662, issue of May 16.
 OCTOBER 8-11—American Public Health Association. Page 653, issue of April 11.
 OCTOBER 11-12—Pan-American Congress of Ophthalmology. Page 658, issue of May 23.
 OCTOBER 14-25—1940 Graduate Portfolio of the New York Academy of Medicine. Page 938, issue of May 30.
 OCTOBER 21—American Board of Internal Medicine, Inc. Page 369, issue of February 29.
 JANUARY 4, 1941—American Board of Obstetrics and Gynecology. Page 1064.
 APRIL 21-25, 1941—American College of Physicians. Notice above.

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

JULY 31.
 OCTOBER 30.

BOOKS RECEIVED FOR REVIEW

Malaria and Colonization in the Carolina Low Country 1526-1696. St. Julien R. Childs. The Johns Hopkins University Studies in Historical and Political Science. Series LVIII Number 1. 292 pp. Baltimore: Johns Hopkins Press, 1940. \$2.50.

La thoracoplastie Elective primitive d'association de substitution. J. Angrany, L. Michon and A. De Vicheux. 127 pp. Paris: Masson et Cie, 1940. \$1.35.

Aux confins de la dyspepie. Maurice Loeper. 307 pp. Paris: Masson et Cie, 1940. \$1.85.

Traité de la transfusion sanguine. G. Jeannoncy and G. Ringenbach. 386 pp. Paris: Masson et Cie, 1940. \$2.50.

Dizionario di Medicina per Medici e Famiglie. Giulio Casali. 2 vol. 1785 pp. Torino: Italy Unione Tipografica—Editrice Torinese, 1939. Lire 300.

The New International Clinics: Original contributions in the clinic and evaluated reviews of current advances in the medical arts. Edited by George Morris Pictor. Vol. 7.

N S 3. 365 pp. Philadelphia, Mootreal and New York. J. B. Lippincott Co., 1940. \$3.00.

The Journal of Gideon Mantell Surgeon and Geologist Covering the years 1818-1852. Edited by E. Cecil Curwen. 293 pp. New York, London and Toronto: Oxford University Press, 1939. \$4.25.

Complete Guide for the Deafened. A. F. Niemoeller. 256 pp. New York: Harvest House, 1940. \$3.00.

Handbook of Hearing Aids. A. F. Niemoeller. 156 pp. New York: Harvest House, 1940. \$3.00.

Physical Therapy for Nurses. Richard Kovács. Second edition. 335 pp. Philadelphia: Lea & Febiger, 1940. \$3.25.

Adventures of a Biologist. J. B. S. Haldane. Second edition. 281 pp. New York and London: Harper & Brothers, 1940. \$2.75.

BOOK REVIEWS

A Textbook of Surgery. John Homans. Fifth edition. 1272 pp. Springfield, Illinois, and Baltimore: Charles C. Thomas, 1940. \$8.00.

Surgery is no longer a subject that can be taught in a course or series of lecture-clinics. The student constantly encounters surgical material in his clinical experience, and often finds difficulty in crystallizing the many apparently unrelated problems. Dr. Homans' book is a great help in systematizing the conditions that need surgery for effective therapy.

The book stresses underlying principles rather than simply giving the correct diagnostic procedure and treatment for a particular disease. A historical survey of the subject is found at the beginning of each section. Then follow the anatomy and physiology of the organ, thereby suggesting to the student the fundamentals of good medical reasoning. If the reader cannot find the detail of information desired there is appended an excellent bibliography for further reference. Discussions of the surgery of the organs of special sense, of the female pelvic organs, of fractures and of the thorax serve as examples of the large field that is surveyed.

There have been many new advances in surgery since the last edition four years ago. The use of vitamin K in jaundice, the ligation of a patent ductus arteriosus and the treatment of parathyroid tetany with A.T. 10 are only a few illustrations of how this book keeps pace with recent developments. Dr. Homans has written a masterly treatise on modern surgery and is to be commended for his zeal in keeping it abreast of current progress.

Love Problems of Adolescence. Oliver M. Butterfield. 212 pp. New York: Emerson Books, Inc., 1939. \$2.25.

This book is a valuable contribution to a growing accumulation of information concerning the trends of adolescent thinking and interest, particularly as they apply to the sexual mores, and it is unique in that the information is derived from concrete questions raised by the young people themselves and is not merely an interpretation of their emotional interests as seen through the eyes of their elders.

Counselors of youth will find nothing new by way of information but much to substantiate their own experiences when confronted with love problems of boys and girls.

The introduction is concerned with a description of the study, a definition of "love problems" and a consideration of the character of the group and the modus operandi of the study. In the five succeeding chapters the author discusses the various questions which appear as the im-

mediate concern of these young people, running from means of securing dates, parental interference, night hours, chaperons and so forth, through miscellaneous behavior problems, dancing, smoking, drinking, kissing, petting, sex stimulation, masturbation, homosexuality and the social significance of menstruation and venereal disease. He found that the young people wished to discuss matters of mate selection and teen-age love, that there was an earnest desire for factual sex information, and that the trend is to think of love, sexual relations and marriage relationships as permanent.

In discussing the age factor in marriage the author emphasizes that those who recommend early marriages are so much concerned with the biological factor that they fail to give adequate consideration to the economic, sociological and psychological factors. However, he points out that studies to date have tended to negate the age factor as a means of predicting either success or failure in marriage.

Birth control and divorce appear to have been academically discussed, but the meat of the study is best expressed by the author when he says

Most of the spontaneous questions in these groups centered on the sexual aspects of marriage. Here lies the mystery of the unknown and the undiscussed. Anxiety on this score grows partly out of the labored efforts of adults to cover up this side of marriage and the persistent repetition during childhood and adolescence that any form of sexual indulgence is wrong. Uninstructed youth finds it difficult to understand how what is wrong before marriage can become the highest expression of affection in it.

The New International Clinics. Original contributions, clinics and evaluated reviews of current advances in the medical arts. Edited by George M. Piersol. Vol. 4. N. S. 2. 339 pp. Philadelphia: Montreal and New York: J. B. Lippincott Co., 1939. \$3.00.

The treatment of pneumococcal pneumonia continues to attract considerable attention, and in this volume one finds the subject approached from the chemotherapeutic and serotherapeutic angles; there is also an article on the surgical complications. In addition, there are discussions of such unusual subjects as pseudo-arteriosclerosis, vitamin K in pseudohemophilia, hepatica of childhood, and myogelosis in postural foot defects. The remainder of the volume consists of a discussion of conventional subjects, all of which round out an excellent publication.

Traité de biocolloïdologie. Tome V. *État colloïdal et médecine.* Fascicule 1. *Le Sang.* 151 pp. Fascicule 2. *Liquides et tissus organiques.* 299 pp. W. Kopaczewski. Paris: Gauthier-Villars, 1938. 160 Fr. fr.

The author of this two-volume work states that the medical profession has paid but little attention to the fundamental physical sciences and their application to the various problems of disease. He believes that studies of the behavior of the colloids will inevitably solve the riddles of human disease, provided only that the doctors learn something about them. He quotes d'Arsonval as saying "that the professors of clinical medicine are highly decorous and highly decorated individuals who ignore physics and boast about it." He states, perhaps truly, that one is struck by the general lack of comprehension by the medical profession of the basic problems of experimental medicine, by its lack of mathematical formulation of results and by its erroneous appreciation of them. In place of clear and readily established notions, it has forged a Greco-Latin nomenclature with high-sounding, pseudo-scientific facts. It is a very serious

tertaining introduction, which is capped by a lapse into poetic prose and then into poetry itself. "Following out ideas, inspired by the passion of research and by the curiosity of nature, controlled by experience, guided by the rhythm of pure reason, is to possess the palpitating life of true poetry."

After this divine introduction, one is disappointed in Chapter 1 which deals, very sketchily, with such matters as blood volume, the total red-cell count, the various blood chemical constituents and so forth. However, this disappointment is more than atoned by the conclusions, which state that since chemical and hematological data vary so greatly, it is impossible to place any credence on their results. "Ultra precise chemical methods can only result in gross errors in diagnosis, since the errors of the methods are greater than the physiological limits of the chemical studied." The author states that the physical characters of the serum and plasma tell another story.

The physical measurements which the author believes are of great importance and which have been ignored, are the density of the blood, the freezing point, the electrical conductivity, the pH, the viscosity, the surface tension, the refractive index and the rotatory power. Curiously enough, no mention is made of the sedimentation rate, a physical measurement which has become so popular. The application of these methods to the blood, spinal fluid, urine, saliva and, finally, organ extracts is indicated. The value of these methods in studying the effects of mineral waters, coffee, beer and so forth on the composition of the urine is well brought out. Aside from this, one fails—perhaps due to lack of comprehension—to get much out of this erudite work. One must conclude, therefore, that either the author is a genius far ahead of his time or he is, shall we say, misguided. Time alone will tell.

Trapping the Common Cold. George S. Foster. 125 pp. New York: Fleming H. Revell Co., 1940. \$1.25.

The author advances the theory that by following certain rules of diet, fluid intake and exercise one can be protected from attacks of the common cold. Although the reviewer cannot take exception to some of the recommendations, at least insofar as creating a sense of general well being is concerned, the book contains a great deal of physiological nonsense. There is no scientific proof of the main thesis, namely, that the common cold can be obviated in this manner.

Modern Diabetic Care. Including instructions in the diet and the use of the old and new insulins. Herbert Pollack. 216 pp. New York: Harcourt, Brace & Co., 1940. \$2.00.

This excellent manual is intended for use by diabetic patients, physicians and dietitians. The style is simple and direct, and excessive technical details are avoided. The usual chapters dealing with the nature of diabetes, the physiology of nutrition, the technique of insulin administration and the prescription of diets are included. Diabetic coma, surgery and juvenile diabetes are briefly discussed.

One may criticize his definition of diabetes—"the loss of the body's ability to burn sugars"—as being too great a simplification. The therapeutic use of alcohol for patients suffering with impaired peripheral circulation scarcely deserves mention. There is some inconsistency in prescribing diets accurately in grams and yet failing to teach patients the use of food scales, other students of diabetes have found that the use of food scales, at least for a few months, is the most dependable method of

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THE EFFECT OF SULFANILAMIDE ON THE LENGTH OF LIFE OF PATIENTS WITH SUBACUTE BACTERIAL ENDOCARDITIS*

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A REVIEW of the literature concerning subacute bacterial endocarditis shows that much is yet to be learned about the etiology of this relatively common disease. Reimann¹ believes that it has been impossible to prove that the streptococcus is anything more than a secondary invader, although the work of Rosenow, in producing the disease by intravenous injection of certain strains of *Streptococcus viridans* without previous injury to the heart valves, appears to demonstrate that this organism is the primary invader in the disease. Evidence has been presented by Feldman and Trace,² among others that the disease is closely related to infection in the mouth, throat and nose. Experiments tending to prove that foci of infection in the oropharynx may be the cause of endocarditis have been performed by Welch and his co-workers,³ but others, among them Kinsella and Muether,⁴ have been unable to do this, although the two latter produced an endocarditis by the intravenous injection of *Streptococcus viridans* into dogs whose heart valves had previously been injured. They believe that the condition produced in dogs which is apparently identical pathologically with subacute bacterial endocarditis in the human subject, is dissimilar from it because of the fundamental difference between the traumatized valve of the dog and the diseased valve of the human being, and they plan a study to compare the two more closely. In general, all recent experimental work is encouraging in tone, as Graybiel⁵ has stated. Nevertheless much more must be done in order to determine the factors leading to the invasion of the blood stream, the attack on the endocardium and the failure in human beings of methods of treatment successful in experimental animals.

The treatment of subacute bacterial endocarditis, as with any disease whose etiology and pathogenesis are not understood has been carried out to a great extent on a trial-and-error basis. As new methods of combating other forms of infection have been discovered they have been applied to the treatment of endocarditis. As each has been tried, occasional reports of cures have been published then, as further work has been done, the new method has been shown to be of little value and other ideas have been put to test. It is probable that the cures credited to these methods occurred in cases of so-called benign endocarditis.⁶

With the discovery of sulfanilamide and the reports of excellent results with its use in hemolytic streptococcus infections it was at once hoped that the drug would be equally effective in the treatment of conditions in which *Streptococcus viridans* was involved. Early reports, indeed indicated that excellent results might be obtained through its use in the treatment of subacute bacterial endocarditis. One case of recovery was reported.⁷ But with the reports as to its beneficial effects came others dealing with its adverse effects. These are well set forth in the monograph of Long and Bliss⁸ who also note that cerebral toxic effects such as headache, anorexia, nausea, vomiting and dizziness, cyanosis, simple fever, dermatitis, acidosis, renal damage (the occurrence of which they question), jaundice without anemia, mild hemolytic anemia, acute hemolytic anemia, agranulocytic angina and leukemoid reactions may be observed as a result of sulfanilamide therapy. The neutropenic states resulting from the use of the drug are by far the most serious reactions covered, and reports of these have been many.⁹

In the past nine years, 76 proved cases of subacute bacterial endocarditis have been seen at the University of Chicago Clinics. The diagnosis was

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based on certain criteria the presence of active endocarditis, fever, positive blood culture and embolic phenomena¹¹ Of these cases, 18 were treated with sulfanilamide In studying the effects of this drug on the course of subacute bacterial endocarditis, 4 cases were excluded* so that, for the sake of uniformity, only cases in which the *Streptococcus viridans* was grown on blood culture might be considered The 14 remaining cases were studied in order to determine the effect of the drug on bacteremia, fever and time of survival At the same time an attempt was made to note the presence of changes in the blood-cell counts, of dermatitis and of other ill effects

EFFECT ON BACTEREMIA

In 5 of the 14 cases there was a definite drop in colony count on blood culture In the majority of cases four plates, each with 1 cc of blood, were poured, and the colonies counted and averaged An example of this fall in count is found in the following case

R. S. (No 183396), a 17-year-old girl, entered the Albert Merritt Billings Hospital September 11, 1937, on the service of Dr Allan T Kenyon. She was born a blue baby and lived against the expectation of the physician who delivered her About 2 years prior to admission she had had an episode of swollen and painful knee and ankle joints and spent 5 weeks in bed The onset of the present illness apparently occurred in April, 1937, when an acute upper respiratory infection was followed by pain in the lower chest posteriorly, not associated with respiration There was a weight loss of 35 pounds in the next 4 months Since April, 1937, there had been several attacks of epistaxis Profuse night sweats had been present for 1 month

On examination the patient was seen to be acutely ill The heart was enlarged to the left There was a thrill at the base and a loud diastolic and soft systolic murmur over this area At the apex was a blowing systolic murmur immediately following a markedly accentuated second sound A water-hammer pulse was present The red-cell count was 3,300,000, the hemoglobin 70 per cent and the white-cell count 10,400 A blood culture showed 117 colonies of *Streptococcus viridans* per cubic centimeter of blood Subsequent cultures showed 280 colonies on September 13, 129 on September 15 and 274 on September 17 On September 19, 44 gm (66 gr) of Prontylin was given, the dose being increased the next day to 48 gm (72 gr) daily By September 24 the colony count had fallen to 63 per cubic centimeter of blood and on September 28 to 39 On the latter day the Prontylin was stopped and the following note was made by the intern "No noticeable temperature change during Prontylin administration Hemoglobin remained about the same while Prontylin was being given." On October 5 the colonies numbered 32 On October 6 the patient developed nausea, vomiting and diarrhea, in spite of a blood transfusion and other supportive measures she died on October 15 Permission for an autopsy was refused

*In three of these diphtheroids were grown in the blood cultures and in the fourth a gram negative rod

A tabulation of the colony counts in 11 of the patients studied (Table 1) shows a definite fall

TABLE 1 *Effect of Sulfanilamide Therapy on Colony Count*

| Hos PITAL No | BEFORE THERAPY | COLONY COUNT | | |
|--------------------|-------------------|------------------|----------------|-------------------------|
| | | FIRST WEEK | SECOND WEEK | THIRD WEEK AND AFTER |
| 1567 | 104-261 | 36-12 | 19-6 | 28-4 |
| 172452 | 2000 (estimated) | 1000 (estimated) | | |
| 183396 | 117-280 | 63 | 39 | 32 |
| 193400 | 7-38 | 2-3 | 5 | 4 |
| 196449* | 14-29 | 2 | 5 | 8 |
| 200187 | 129-133 | 5 | 4 | 2 |
| 171437 | 252-68 | 88-36 | 79 | |
| 195967 | 9-3 | 8 | | |
| 219952 | 40 | | 40 | 20 |
| 174595† | 178-700 | 754 | Innumerable | Innumerable |
| 210329 | 45-89 | 90-117 | | |

*Sulfanilamide was stopped for a short time after the second week the count rose to 32 but fell to 8 when sulfanilamide was resumed.

†The average dose of sulfanilamide in all but this case was 3 to 4 gm. (45 to 60 gr) daily, this patient received 6 gm (90 gr) daily

in count in 5 cases, a questionable change in 4 and a rise, in spite of sulfanilamide therapy, in 2

EFFECT ON FEVER

In the majority of patients with subacute bacterial endocarditis there is fluctuation in the height of the fever curve, it was therefore difficult to determine definitely whether the administration of sulfanilamide had any effect on the temperature In 1 case (Case 9), which is reported more fully below, a definite fall in the average level of the afternoon spike occurred two days after the drug had been started, the height of the spike was maintained at a nearly normal level for five days, for the next two months it was lower than it had been before sulfanilamide therapy had been started

TOXIC EFFECTS

Changes in White-Cell Count

In the majority of cases the white-cell count ran between 9000 and 14,000, with an increase in the percentage of polymorphonuclear cells In several cases the count fell to 600 during the course of sulfanilamide administration, but in all cases it rose immediately without specific treatment The fall was probably unrelated to sulfanilamide therapy, since this was also observed in cases not receiving the drug

Changes in Red-Cell Count

There were no cases of acute hemolytic anemia in this series There was, however, in most cases, a fall in the red-cell count, which probably occurred as a result of the disease process rather than because of sulfanilamide therapy In only 1 case was there a fall in the count that could be said to have

occurred immediately following the start of sulfanilamide therapy. The report follows:

R. F. (No. 200187) a 26-year-old woman was admitted on June 17 1938 on the service of Dr. C. Phillip Miller. She had had rheumatic fever at the age of 14. Following this illness she remained well until October 1937 when a tonsillectomy was performed. She bled severely following the operation and required four transfusions. Since the tonsillectomy she had been in bed becoming progressively weaker with the body weight decreasing from 150 to 92 pounds. During the first part of the illness she had pain under the costovertebral angles and considerable vomiting both of which had continued to the time of admission. In January 1938 she began to notice severe palpitation of the heart and joint pains in all extremities. Two weeks prior to admission her family physician had told her that she had an infection of the blood stream.

On physical examination at admission the patient was very weak and pale. The heart rate was 120 the heart was not enlarged there was a thrill at the cardiac apex, with systolic and diastolic murmurs over this area. The second pulmonic sound was accentuated over the aortic area could be heard a systolic murmur with a snapping second sound. The liver was felt 2 cm. below the right costal margin. The spleen was not definitely felt, but there was resistance on inspiration in the left upper quadrant of the abdomen. There was slight clubbing of the fingers. The red-cell count was 3,100,000 and the white-cell count 10,350. On June 18 a blood culture showed 129 colonies of *Streptococcus viridans* per cubic centimeter of blood. On June 19 sulfanilamide was started in doses ranging from 3.6 to 5.4 gm. (55 to 80 gr.) per day. The colony count on this day was 133. On June 20 the red-cell count was 4,200,000 the hemoglobin 54 per cent and the white-cell count 13,560. By June 24 the red-cell count had fallen to 2,800,000 and the hemoglobin to 42 per cent the white-cell count had risen to 20,000. Meantime the colony count had dropped to 5 per cubic centimeter of blood and on June 29 it fell to 4. On June 26 the patient was given a transfusion of 500 cc. of blood. The red-cell count ranged between 2,800,000 and 3,040,000 until July 2 when the drug was stopped because the patient complained of a severe headache. The headache was gone by July 4 and sulfanilamide was resumed. It was stopped on July 6 because of intense dizziness, and resumed on July 15. On August 2, however the drug was again stopped because of the appearance of papilledema without other eye signs or symptoms. On July 21 a fall in temperature from 102 to 100 F was noted, and the latter level persisted until August 11. On July 29 a blood culture grew an average of 2 colonies per cubic centimeter of blood. On August 6 the patient felt better. The red-cell count ranged from 3,140,000 on July 17 to 2,460,000 on August 4 and 3,950,000 on August 14. On August 11 sulfanilamide was again started on August 12 the patient began to have nausea after each dose. She developed a left hemiplegia and facial paralysis on August 14 gradually failed, and died on August 23.

The autopsy findings included subacute bacterial endocarditis affecting the mitral valve and wall of the left atrium, antecedent chronic rheumatic mitral valvulitis and left atrial endocarditis, moderate mitral stenosis and rheumatic aortic endocarditis, minimal and healed.

Comment. In addition to the mild hemolytic anemia noted between June 20 and June 24 the severe headache, nausea and papilledema were all believed to have resulted from the toxic action of sulfanilamide.

Dermatitis

One patient developed a dermatitis which was thought to have resulted from sensitization of the skin to sunlight by sulfanilamide. The report follows.

C. E. (No. 219952) a 28-year-old man was admitted May 7 1939 on the service of Dr. George F. Dick. He complained of weakness, fatigue and fever of 8 months duration and sore fingers of 3 months duration. For the last 3 months he had developed ankle swelling and tiny red areas on his feet and ankles after standing for 15 to 30 minutes. He had had rheumatic fever each winter from the age of 12 to that of 18. Prior to the time of onset of the present illness he had worked as a railroad clerk and had felt well.

On physical examination the patient was pale there were petechiae over the left scapula and over the left tibia in its middle third. The posterior pharynx was red and granular the tonsils had been removed. Over the lung bases were increased breath sounds with subcrepitant rales which cleared on coughing. The heart rate was 120 the apex by palpation was 10 cm. to the left of the midline in the fifth intercostal space. There was a systolic thrill at the apex with a systolic apical murmur referred especially to the left axilla but audible over the entire precordium. The right testis was undescended. There was puffiness but no pitting of the feet and ankles. A tender, red area 1 cm. in diameter was noted on the left index finger. The red-cell count was 3,100,000 and the white-cell count 9000. A blood culture was positive for *Streptococcus viridans* with 40 colonies per cubic centimeter. On May 13 the administration of sulfanilamide was begun. The oral temperature up to this time had been rising daily to around 102 F at 4 p.m. By May 15 the curve had flattened and until May 20 the rectal temperature did not rise above 99 F. From May 20 to July 20 it reached a daily peak of 102 F. On May 21 because of a rise in the pulse to over 140 the patient was digitalized and received from 0.1 to 0.3 gm. (1 to 3 cat units) of digitalis daily thereafter. On May 29 the colony count was 40 per cubic centimeter of blood and on June 9 20.

On May 31 after 18 days of sulfanilamide therapy the patient developed a macular erythematous rash, blanching on pressure, over the left side of the body. This was thought to be a dermatitis medicamentosa, and members of the Dermatology Service concurred in this diagnosis. At the time of appearance of the rash the patient had been receiving 3.6 gm. (54 gr.) of sulfanilamide daily which had kept the blood level at about 13.3 mg. per 100 cc. 0.6 gm. (10 gr.) of ferrous sulfate daily 0.2 to 0.3 gm. (2 to 3 cat units) of digitalis daily 0.010 gm. (1/4 gr.) of morphine sulfate four times a day and nasal oxygen. The patient's bed was so situated that the sun shone on the left side of his body from 1 p.m. until evening each day and it was the opinion of the attending physician and members of the Dermatology Service that sulfanilamide sensitization to sunlight was the most probable etiologic factor.

On July 20 the patient began to have hiccoughs, a rise in rectal temperature to 102.6 F increased rales in both lung bases and a rise in pulse to 140. In spite of blood transfusions and general treatment, he died on July 29.

The autopsy findings included subacute bacterial endocarditis, embolization of small vessels throughout the body mesenteric embolus with peritonitis, and early bronchopneumonia.

EFFECT ON TIME OF SURVIVAL

Of the 76 cases of subacute bacterial endocarditis which have been seen at the University of Chicago Clinics since 1930, it was possible to determine the date of death in 40. In 10 of these the patients had received sulfanilamide. All had been found to have a bacteremia caused by *Streptococcus viridans*. The date of onset was not easily determined. In many cases it was based on a his-

longer than seven months, none lived longer than eleven months. In the group of 30 patients treated without sulfanilamide, the time of survival ranged from two to seventeen months, the average being 5.6 months. Five patients lived longer than seven months and 3 longer than eleven months. Certainly, on the basis of these statistics, no effect on the prolongation of life by sulfanil-

TABLE 2 Summary of All Cases of Subacute Bacterial Endocarditis Patients Studied

| CASE No | HOSPITAL No | SEX | AGE | DATE OF ONSET | DATE OF ADMISSION | DATE OF DISCHARGE | DATE OF DEATH | DURATION OF LIFE AFTER ONSET mo | HISTORY OF RHEUMATIC FEVER OR OF OTHER DISEASES OF SIGNIFICANCE | AUTOPSY |
|-------------------------------------|-------------|-----|-----|---------------|-------------------|-------------------|---------------|---------------------------------|---|---------|
| Patients Receiving No Sulfanilamide | | | | | | | | | | |
| 1 | 1637 | F | 21 | 3/—/30 | 9/11/30 | | 9/24/30 | 6 | Signs of cardiac insufficiency in childhood. At autopsy: mitral regurgitation and stenosis, partial patent foramen ovale. | Yes |
| 2 | 12898 | M | 22 | 12/—/31 | 3/11/32 | 3/18/32 | 6/ 9/32 | 5 | Rheumatic fever at 11 | No |
| 3 | 17704 | F | 31 | 7/—/32 | 1/21/33 | | 2/11/33 | 7 | Series of acute childhood diseases at 1 | Yes |
| 4 | 21168 | F | 19 | 1/—/30 | 3/28/30 | 4/10/30 | 5/20/30 | 4 | Growing pains as child | No |
| 5 | 22288 | M | 43 | 2/—/30 | 4/20/30 | | 6/28/30 | 4 | Rheumatic fever in childhood | Yes |
| 6 | 26592 | F | 24 | 6/—/33 | 9/24/33 | 10/14/33 | 10/27/33 | 4 | Rheumatic fever at 10 | No |
| 7 | 31829 | M | 39 | 6/—/30 | 12/26/30 | | 1/27/31 | 7 | Rheumatic fever at 21 | Yes |
| 8 | 39772 | M | 39 | 4/—/31 | 6/ 4/31 | 6/13/31 | 10/—/31 | 6 | Rheumatic fever at 11 | No |
| 9 | 50419 | M | 28 | 3/—/32 | 5/10/32 | | 6/23/32 | 3 | Splenic aemia, rheumatic fever at 12 | No |
| 10 | 55151 | M | 32 | 1/—/32 | 4/29/32 | | 5/ 7/32 | 4 | Syphilis | Yes |
| 11 | 62926 | M | 72 | 6/—/32 | 7/12/32 | 7/13/32 | 1/—/33 | 7 | None | No |
| 12 | 70076 | F | 23 | 7/—/32 | 10/19/32 | | 11/ 6/32 | 3 | None | No |
| 13 | 71401 | M | 58 | 8/—/32 | 11/10/32 | | 12/15/32 | 4 | Rheumatic fever at 10, infectious arthritis. | No |
| 14 | 74338 | F | 26 | 4/—/32 | 1/20/33 | 3/ 4/33 | 4/10/33 | 12 | Rheumatic fever at 15 | No |
| 15 | 75304 | M | 51 | 11/—/32 | 1/17/33 | | 2/ 9/33 | 3 | Rheumatic fever at 20 | Yes |
| 16 | 76680 | F | 18 | 11/—/32 | 3/17/33 | | 3/18/33 | 4 | Congenital heart disease | Yes |
| 17 | 80299 | M | 28 | 6/—/35 | 8/19/35 | | 2/25/36 | 8 | None | No |
| 18 | 84445 | F | 23 | 4/—/33 | 6/17/33 | | 9/19/33 | 5 | Rheumatic fever at 5 | No |
| 19 | 88139 | F | 24 | 6/—/33 | 8/11/33 | | 10/20/33 | 4 | None | No |
| 20 | 93842 | M | 49 | 11/—/32 | 9/14/34 | | 9/26/34 | 14 | Rheumatic fever at 14 | No |
| 21 | 106885 | F | 41 | 4/—/34 | 6/27/34 | 7/11/34 | 8/ 8/34 | 4 | Rheumatic fever at 14 | No |
| 22 | 106957 | F | 23 | 2/—/34 | 6/28/34 | | 6/28/34 | 4 | None | No |
| 23 | 108913 | M | 72 | 7/—/34 | 7/27/34 | | 9/20/34 | 2 | None | Yes |
| 24 | 118500 | M | 49 | 12/—/33 | 4/22/35 | | 5/28/35 | 17 | None | Yes |
| 25 | 123326 | M | 33 | 6/—/34 | 3/ 5/35 | | 3/15/35 | 9 | Rheumatic fever at 30 | Yes |
| 26 | 131932 | F | 33 | 3/—/35 | 7/10/35 | | 7/11/35 | 4 | Rheumatic fever at 12 | Yes |
| 27 | 142234 | F | 23 | 5/—/35 | 1/ 7/35 | | 4/19/35 | 11 | None | Yes |
| 28 | 143582 | M | 61 | 10/—/35 | 1/ 8/36 | 1/28/36 | 3/12/36 | 5 | None | No |
| 29 | 150750 | M | 42 | 3/—/36 | 5/ 4/36 | | 5/ 9/36 | 2 | Syphilis | No |
| 30 | 211961 | M | 54 | 11/—/38 | 1/ 5/39 | 1/16/39 | 1/21/39 | 2 | None | No |
| Patients Treated with Sulfanilamide | | | | | | | | | | |
| 1 | 1567 | M | 34 | 9/—/36 | 2/ 9/37 | | 7/12/37 | 5 | Rheumatic fever in childhood | No |
| 2 | 171437 | F | 15 | 10/—/36 | 3/17/36 | 3/31/37 | 4/18/37 | 6 | Rheumatic fever from 10 to 14 | No |
| 3 | 172452 | F | 25 | 11/—/36 | 3/31/37 | | 4/12/37 | 5 | None | Yes |
| 4 | 174595 | F | 33 | 12/—/36 | 5/ 4/37 | | 5/17/37 | 5 | None | Yes |
| 5 | 183396 | F | 17 | 7/—/37 | 9/11/37 | | 10/15/37 | 3 | Congenital heart disease (?), rheumatic fever at 14 | No |
| 6 | 187310 | M | 56 | 12/—/37 | 1/ 5/38 | | 1/16/38 | 1 | Rheumatic fever from 18 to 19 | Yes |
| 7 | 195967 | M | 16 | 9/—/37 | 4/ 5/38 | 4/22/38 | 8/—/38 | 11 | Severe pneumonia at 5 | No |
| 8 | 196449 | M | 43 | 12/—/37 | 4/22/38 | 5/11/38 | 6/11/38 | 6 | None | No |
| 9 | 199591 | M | 49 | 5/—/38 | 6/ 3/38 | | 9/18/38 | 4 | Rheumatic fever at 10 | Yes |
| 10 | 200187 | F | 26 | 10/—/37 | 6/17/38 | | 8/23/38 | 10 | Rheumatic fever at 14 | Yes |

tory of influenza or similar acute upper-respiratory infection in a previously symptomless individual, followed by chills, fever, cardiac signs, weight loss, weakness and embolic phenomena. Occasionally it was calculated from the date of surgical procedures which were followed by the symptoms just noted. Table 2 summarizes the cases studied.

The 10 patients who received sulfanilamide, averaging about 3 gm (45 gr) daily, lived from one to eleven months after onset. The average time of survival was 5.6 months. Three patients lived longer than seven months, none lived longer than eleven months. In the group of 30 patients treated without sulfanilamide, the time of survival ranged from two to seventeen months, the average being 5.6 months. Five patients lived longer than seven months and 3 longer than eleven months. Certainly, on the basis of these statistics, no effect on the prolongation of life by sulfanilamide can be observed. The average length of life after onset in each of the two groups was the same, while the fact that 3 untreated patients lived longer than eleven months, and that none of those treated did so, might be interpreted as indicating that sulfanilamide actually shortened the time of survival.

SUMMARY

Sulfanilamide therapy had no effect on the general course of 13 cases of subacute bacterial endocarditis.

The main beneficial effect was a fall in the number of bacteria in the blood stream

In one case there was a definite drop in the temperature curve coincident with the use of sulfanil

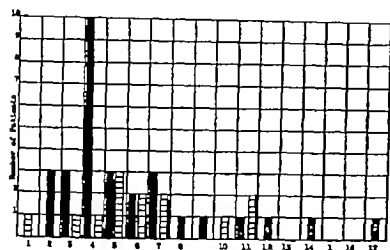


FIGURE 1 Length of Life (After Onset) of Patients with Subacute Bacterial Endocarditis

The cross-hatched blocks represent patients who received sulfanilamide the solid blocks those who did not

amide, in other cases it was thought possible that lowering of the level was related to use of the drug

In general no severe toxic effects were noted. At least one case of hemolytic anemia was noted. There was one case of dermatitis believed due to sensitization of the skin to sunlight by sulfanilamide. Nausea, headache and papilledema were

also noted, and were believed to have been caused by the drug

Sulfanilamide did not prolong the life of patients in this series, and there is some evidence that it may have actually shortened the time of survival.

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SODIUM MORRHUATE IN THE TREATMENT OF EPICONDYLITIS OF THE HUMERUS

A Report of Five Cases

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RECENT unsatisfactory results in the treatment of epicondylitis of the humerus, or radiohumeral bursitis, by conservative methods, have led to a search for a simple nonsurgical method which would give greater promise of relief and cure. Experience with conservative treatment by physiotherapeutic and other means has resulted only in the discouragement of physician and patient. In 1937, while considering the efficacy of sodium morrhuate obliteration of prepatellar bursas, I decided to use the drug in a case of epicondylitis which was very resistant to the usual physiotherapeutic methods. The successful cure of this case after two injections of sodium morrhuate, and the complete freedom from all symptoms in two

months, led to the further application of the method

A search of the literature on this subject reveals that there are many divergent opinions regarding pathology and treatment. The review of North¹ is all that can be desired for an understanding of the various phases of the subject. Of interest is Cynax's² view that injections by alcohol, carbolic acid and novocain are uncertain are of small significance and have little effect on the course of disability. He is of the same opinion regarding rest, x-ray therapy, diathermy, ionization and removal of foci of infection.

While only passing mention is made of novocain infiltration in the American literature the French have taken this method of treating the

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condition more seriously Massart³ in 1935 reported the cure of three tennis players by the injection of novocain into the painful region. He endorsed the method for its satisfactory results, and credited Leriche with its application in this condition. Leriche⁴ confirmed the efficacy of the method and stated that he tried it first in 1928 and obtained a cure with two injections. Tavernier⁵ questioned these results and stated that in his hands the method was not so regularly efficacious as Massart believed. It is my own opinion that the infiltration method has been passed over too lightly. Its very simplicity has taken away from the method the serious consideration it deserves.

The first three cases reported here are from my own experience. The last two cases are from the records of my brother, Dr. Joseph E. Slowick, of Palmer, Massachusetts, who was induced to try the method on my recommendation.

CASE REPORTS

CASE 1 W D G, a 38-year-old automobile service-station manager, was first seen on May 22, 1937. He complained of pain on the outer surface of the left elbow on movement. He stated that 4 days previously, while changing a tire, he had turned and struck the handle of the jack with his left elbow on the bony prominence of the outer surface. From that time he complained of pain on motion of the hand. The arm tired easily, and at rest there was a feeling of numbness. He had never had trouble with the elbow before.

Physical examination showed a young man of rugged physique. The examination was not remarkable. The teeth were negative on gross examination. The tonsils had been removed. The left elbow, as compared with the right, showed a slight fullness just distal to the epicondyle, which was tender on pressure in an area about 0.9 cm in diameter. Grasping and flexion and extension movements of the hand caused pain at the injured area. There was no discoloration. X-ray examination of the elbow on May 22 showed no bony changes.

A diagnosis of epicondylitis was made and treatment by diathermy and massage was started, and was continued until July 3, three times weekly. There was no improvement at the end of that time. This treatment was discontinued and 0.5 cc of 1 per cent novocain was injected into the site under the tendon of the extensor group. There was immediate relief by this procedure, with recurrence the next day.

Five days later a second injection of novocain was made, with the same result. On July 13 the skin and subjacent tissues were injected with a small amount of novocain, and 0.3 cc of 5 per cent sodium morrhuate was injected into the area under the extensor tendon. On July 16 the patient reported that in the interim there was an exaggeration of symptoms, but on that day the flare-up had subsided. At subsequent visits on July 19 and 25 and August 3 there was a definite diminution of the pain on movement of the wrist and hand. A second injection of 5 per cent sodium morrhuate was made on August 4.

On August 20 the patient reported that a slight flare-up had again occurred, which lasted 3 days. Following this

there was a rapid disappearance of the pain. On September 2 he was completely well. Following the first injection of sodium morrhuate there was an increase in the swelling at the site, and there was a slight fluctuation in that area which continued until the last visit on September 2.

On June 14, 1939, the patient reported that he had been entirely well since the visit of September, 1937. An x-ray examination at this time revealed no bony changes at the site of the external epicondyle.

CASE 2 A M, a 41-year-old woman, was seen on October 15, 1938. She was employed as an imprinter, operating a machine which required her to move the hands and arms from side to side, and toward the midline of the body. She had been doing this work for several years. Three months before this examination she began to complain of pain over the external aspect of the right elbow. The joint seemed stiff and painful on using the arm and hand in her work. With a rest over a week the condition improved, but when she resumed her work the soreness at the elbow returned. Six years previously the patient had been in an automobile accident and sustained a severe bruise over the external condyle of the right humerus in the region of the present painful area. She had always felt a sensitiveness in that region, but never the present soreness and stiffness. Her appendix was removed 5 months previous to examination. She had had scarlet fever seven years previously.

Physical examination was not remarkable. The right elbow showed a slight fullness just distal to the external epicondyle, which was tender on pressure. Pronation of the forearm and flexion of the wrist with the elbow extended caused pain. Dorsiflexion of the wrist also caused pain in that region. Passive extension of the elbow was complete, but a definite spring was felt when full extension was approached. There was no other tenderness about the elbow. X-ray examination of the elbow on October 15, 1938, showed no alterations of the bony structures and no unusual soft-tissue shadows.

A diagnosis of epicondylitis of the right humerus was made, and treatment with sodium morrhuate was offered and accepted. The first injection was given on October 18, 1938. First, 0.5 cc. of 1 per cent novocain was injected into the tissues beneath the extensor tendon. Then 0.3 cc. of 5 per cent sodium morrhuate was injected beneath the tendon at the attachment. The pain was temporarily aggravated beginning the next day, but subsided in the next 2 days to a dull ache. On October 22 there was found at the site an area of tenderness, with fluctuation over the tendon of the extensor group just distal to the epicondyle.

The patient had been advised to change her work for a short period, and obtained a transfer to clerical work. She was able to continue this throughout the course of her treatment.

On October 25 the treatment was repeated. On November 5 the patient reported that the condition was again aggravated by the sodium morrhuate, but that within 2 days it had subsided markedly. Thereafter there remained only a dull ache. On November 22 she was again examined. There was no complaint on this visit, and the ache had disappeared. There was still a sense of fullness and fluctuation over the epicondyle and attached tendon.

On December 17, the patient reappeared for a checkup and reported that she was well. There was no tenderness, although there was slight fullness in the region of the extensor tendon. On July 19, 1939, she reported that she

had been completely well since the visit of December 1938. She had resumed her usual work.

CASE 3. L. S. C. a 35-year-old woman was first seen on July 11 1939. She complained of pain in the right elbow. She stated that 2 months before, while playing with her son she struck her right elbow thereafter there developed a painful condition at the site of the injury and while she was able to drive a car and do housework, it had continually troubled her. She was unable to grasp pull threads or shake down a thermometer. She obtained temporary relief by hot soaks. Fully extending the elbow aggravated the pain. She had been well previous to the onset of this condition.

At physical examination the right elbow showed a tender area over the external epicondyle, and there was pain on pronating the forearm and flexing the wrist. Extension of the elbow produced a slight spasm when the extreme of the movement was approached, and on such motion the patient complained of pain at the external epicondyle of the humerus. A diagnosis of radiohumeral bursitis was made and the injection treatment was offered and finally accepted.

The first treatment was given on July 24 when a small amount of 1 per cent novocain was injected, followed by 0.3 cc. of 5 per cent sodium morrhuate. On the next day the patient reported that there was a marked increase of pain on moving the hand and wrist. She was unable to fully extend the elbow because of pain. There was slight redness and swelling above the site of the injection. On July 27 she reported improvement but the elbow still felt sore. On August 5 there was no pain whatever. There remained only a slight stiffness in the movement of flexion. The range of motion was normal. There was still present an area of fluctuation distal to the epicondyle, but there was no tenderness. On that day a second injection of 0.3 cc. was made, following a small amount of 1 per cent novocain. On August 12, the patient stated that she had had no pain, but that there was a mild reaction on the day following the injection. Early each morning she noted a dull ache at the epicondylar area. All movements of the elbow and forearm were normal and painless. Examination showed a slight amount of fluctuation still present at the site of injury. On September 9 she stated that she had had no pain since the previous visit, and there was no tenderness on pressure over the area. The motions were normal. She was discharged.

CASE 4. A. W. J., a 48-year-old man was seen on November 1 1938. He complained of pain at the outer aspect of the right elbow. On October 20 he had struck the elbow on a store counter. Pain occurred and increased and there was inability to grip and to supinate forcefully the forearm and hand. Otherwise the patient had been well and worked long hours as a store proprietor.

Physical examination showed a well-developed and well-nourished man of medium build. There was marked tenderness over the external epicondyle of the right humerus, with pain in that region on forceful extension of the wrist and supination of the forearm and hand. X-ray examination revealed no bony changes in that region and a diagnosis of radiohumeral bursitis was made.

Treatment by conservative methods, including sedatives, diathermy and massage three times weekly until November 26, was carried out with only slight relief. Consequently on that day 0.3 cc. of sodium morrhuate was injected into the subcutaneous area at the insertion into the external epicondyle. On December 3 the patient reported considerable improvement. He could then grip

with the right hand. There was slight tenderness over the extensor attachment. A second injection was made on that date. On December 10 he reported improvement of the grip but still had discomfort at the extensor site. A third injection of 0.3 cc. of 5 per cent sodium morrhuate was made. On December 17 the patient reported only slight tenderness at the epicondylar area. His grip was good. On December 24 re-examination showed an excellent grip and only slight tenderness over the epicondyle. There was no pain on movement of the elbow or hand. On June 8 1939 the patient reported that he had been well since the visit of December 24.

CASE 5. J. F. S., a 44-year-old man was seen on February 2 1939. He stated that 4 weeks previously there developed pain in both elbows the right was quite sore, but the left showed less discomfort. There was no injury or strain that he could recall. He worked as an automobile service station manager. He had had pneumonia in childhood and influenza in 1918.

Physical examination showed a well-developed and well-nourished man. The temperature was normal. The tongue was slightly coated and the throat was congested. There were large infected stubs of tonsillar tissue in both fossae. The heart and lungs were normal. The elbows showed tenderness on pressure over both extensor tendons at the epicondyles, more marked on the right. There was no swelling. There was pain at the right elbow when attempting to grip.

Following the injection of 0.5 cc. of 1 per cent novocain 0.3 cc. of 5 per cent sodium morrhuate was injected into the subcutaneous area on the right side. On February 10 the patient reported aggravation of the pain and inability to extend the elbow fully for 3 days following injection. At this examination full extension was obtained. There was moderate tenderness in the region of the epicondyle. Another injection of 0.3 cc. of 5 per cent sodium morrhuate was made. On February 17 the patient reported a slight reaction the day after the injection, but for the next 4 days he had been well. Gripping with the right hand caused some pain in the region of the epicondyle. A third dose of sodium morrhuate was administered at this visit. On February 23 the area over the epicondyle was still painful. On March 7 the patient felt well. There was still slight tenderness over the right epicondyle. On March 20 he reported with a severe cold and remained under treatment for this condition until June 1 1939. On June 24 he returned and stated that there was only slight tenderness on pressure over the epicondyle.

SUMMARY

There has been presented an injection method of treating epicondylitis of the humerus, or radiohumeral bursitis, using sodium morrhuate as the sclerosing agent. The success of the method in a small number of cases warrants its further application. The number and frequency of treatments required must be determined by the application of the method in a larger number of cases. It is probable that slightly smaller doses may be used, thus minimizing the temporary reaction following each injection. The reaction in each of these cases was not so great as to prevent the patient from continuing his work.

The result in Case 5 while satisfactory was not

so spectacular as that in the other 4 cases. This would seem to indicate that the truly infectious type of radiohumeral bursitis does not respond so well as does the traumatic or noninfectious type. However, it does not appear to be contraindicated in cases which show foci of infection.

There has been no evidence of subcutaneous-tissue damage with the use of this sclerosing agent. While there is a theoretical possibility of injecting the sodium morrhuate into an extension of the joint capsule in that region, there has been no evidence of that complication following eleven injections in the 5 cases reported. It goes without

saying that the solution must be placed accurately and by one who understands the anatomy of the region.

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SOME OPPORTUNITIES OF THE MEDICAL PROFESSION*

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IT IS a deeply appreciated opportunity to be here tonight because every meeting of this kind is just one more link in the chain of co-operation that we are trying to build up among all the factors of our great medical fraternity. Were I to be granted a single wish in rising to address this assembly, it would be that you, my esteemed associates, would be as impressed today as I have been impressed throughout the past year by the tremendous responsibilities placed upon us. We are servants of humanity and have a humanitarian service to perform which can be best accomplished by organization, co-operation and education.

These meetings serve many excellent purposes. They provide the opportunity for renewal of friendships, for interchange of ideas, for the taking of inventories of those abstract possessions which can be neither bought nor sold. Our task today is to achieve perspective, for we are told, "The young have aspirations that never come to pass, the old have recollections of things that never happened."

Within a little more than three hundred years the land which we call the United States has become the home of the fourth largest national group in the world. China, of course, is first, India, second, and Soviet Russia, third. When the United States was founded, republics were few and weak, and Europe predicted a speedy end of the young nation. For a time the future did seem uncertain, but dangers were overcome until now, in ex-

tent, stability, population, wealth and power, our republic ranks either first or among the first of the nations of the earth. May we realize this with humility and send up a prayer for the deliverance of our European brethren from their Gethsemane.

Daniel Webster said, "America has proved that it is practicable to elevate the mass of mankind,—the laboring or lower class,—to raise them to self-respect, to make them competent to act a part in the great right and the great duty of self-government, and she has proved that this may be done by education and the diffusion of knowledge." May we strive to maintain our self-respect and our personal as well as our national independence so that this high ideal may not be destroyed.

Opportunity is a word which, like so many others that are excellent, came from the Romans. It means "near port, close to haven." It is "a favorable occasion, time or place for learning or saying or doing a thing." It is an invitation to seek means for improving our efficiency and our service to our fellows. May we now ask what are some of the opportunities in the medical profession?

In the first place, the medical profession has the opportunity of furnishing an example of good citizenship. A good citizen is a man or woman who is doing something of service to the community. A good citizen is a workman who "needeth not to be ashamed." There is no fitting place in society for the selfish and the greedy, and we shall see in time that only insofar as the range and circle of our duties may include others and help and bless them, shall we find the true joy of living.

*Presidential address delivered at the annual banquet of the New Hampshire Medical Society, Manchester, May 15, 1940.

Secondly, the medical profession has the opportunity of safeguarding the health of the community and the State. The medical profession has done more for the race than has ever before been accomplished by any other body of men, insofar as general welfare is concerned. These gifts to the people have come in the form of vaccination, sanitation, anesthesia, aseptic surgery, bacteriology therapeutics and many other branches of medicine. For devoted service, for the highest expression of generosity and good will, the physician occupies a place quite incomparable. The story told by Ian Maclaren, in *Beside the Bonnie Brier Bush* of old Dr McLeod is not exaggerated or overdrawn. It is a tale that may be duplicated in any community. One must believe concerning men of this type that they are motivated by the highest of impulses, and that they minister under the Master, who never turned away from those who were bruised and broken in body. Like a team of two horses slowly pulling a heavy load out of the mire, the family physician and the specialist are, side by side, slowly but surely liberating the human race from the depths of disease. Their combined value cannot be measured in dollars and cents but rather in years of additional life. Together they constitute a great team.

Thirdly, the medical profession has an opportunity of setting an example of sympathy, charity and kindness. In each generation some of the best minds have devoted themselves to the study of the healing art. This will always be so. There is an allure to the practice of medicine which keeps the conscientious physician struggling on for his patient in the face of any difficulty. I like to believe that it is an inherent love of human kind, which makes life's ultimate goal the universal brotherhood of man.

Finally, the medical profession has the opportunity of an interesting future. With the greater knowledge of the causes of disease which time will bring us, there will be put into the hands of the physician of the future a weapon far more powerful than any we can wield today. We may reasonably look forward to the time when many of the evils which afflict us now will be avoidable, and as a result the span of the life of man which even in our own time has extended beyond what it was a hundred years ago, will be stretched far beyond the three score and ten that at one time were allotted.

The practice of medicine had its origin in the far distant past. Primitive man, the ancient ancestor of the present generation, was a savage

who named the earth, ignorant of the phenomena of his existence and of his surroundings. Fear of death was uppermost in his mind. He feared his fellow man and the wild beasts that inhabited the mighty forests, and fled in terror from such natural phenomena as thunder and lightning. He attributed all his misfortunes, including disease, to evil spirits that in his imagination peopled the air about him. To protect himself from these vile spirits he invented good spirits, charms and mystic rites. In due time some one member of the clan or tribe appeared to be more successful than others in combating these evil influences. This man became the magician or medicine man. He was the progenitor of the physician.

About four hundred years before the birth of Christ there lived in Greece a physician whose name was Hippocrates. He became the greatest physician of his age. He was the first to recognize the error of mysticism, magic and religion in medicine. He taught that disease was cured by the natural powers of the body. He practiced bedside observation of symptoms, examined the secretions of the body and investigated the digestibility of various foods. He established the practice of medicine on a rational basis. He also composed a code of ethics to govern the conduct of physicians. He declared that the true physician must be a man of honor, true to himself and honorable in his dealing with all men. This ancient code is the basis for the code of ethics that is in use today by the medical profession. In this day of many codes we of the medical profession can point with pride to this ancient code of ours that has been a lamp to guide the members of our profession throughout all the centuries of the past.

Gradually the science of medicine progressed until today we find not a finished product but a system that has reduced the incidence of disease to a point that is nothing short of miraculous. The death rate from disease has dropped to 9.6 per 1000 and nearly twenty years have been added to man's age expectancy. The number of newborn infants that may reasonably expect to reach maturity has been vastly increased. Trench after trench of man's great enemy, disease, has been taken in our war on that dread enemy of the human race. There remains much more to be done before disease will be entirely under control.

During all these centuries past the physician has never faltered in his endeavor to serve suffering humanity.

Perhaps the most puzzling question a physician ever asks himself is this, What do people expect from a doctor? And that probably suggests another, How do they make their choice when they decide to call a doctor? The great majority of physicians have confessed an inability to get unqualified and uncolored answers to these questions.

The principal reasons for the selection of a particular physician may be attributed to ability and personality: the former consists of economy, willingness, reliability, honesty and quickness, the latter of confidence, warmth of heart and sympathy. Universally, there is a desire to find a doctor in whom perfect trust can be placed.

The personal side of the practice of medicine, which has always played an important and comforting part, steps in at such times and renders a service which the people not only desire but demand. Sympathy, kindness, pity and cheerful hope—no amount of scientific efficiency can take the place of these in the dark hours of sorrow and trouble so common in the experience of all. President Eliot, of Harvard University, once said, "In these intangible things are found the durable satisfactions of life, fame dies and honors perish, but loving kindness is immortal." I should not belittle the importance of science in medicine,—I bow in humble reverence before its beneficent power,—nor should I magnify the personal element, yet many of us know from experience what comfort, hope and assurance the personality of a trusted physician may bring to the bedside of his patient.

At one time parent was parent and child was child. Whether six or sixteen or even twenty-six, the relationship and cleavage between the two was a marked and positive one. Never might the young one infringe on the territory of his parent or question his authority or wisdom. Now this has all changed. Parent is still parent and child is still child, but the old relationship exists in mere skeleton. But in spite of this there is no gainsaying that the wise parent, the cultured and educated and intelligent parent, still owes the same responsible and well-directed guiding spirit and hand to his family. Understanding, subtlety and common sense now enter into the picture. The parent who is not understanding, is not subtle in his direction and does not use the utmost common sense will today fail in his task.

As the modern parent, so the modern physician. The young physician usually bears all the eagerness, all the restlessness, all the liberalism, all the anxious tempo of quick accomplishment. His virtue is his sincerity and his enthusiasm, but his

handicap is inexperience. Who then is in a better position to temper the mood of the young, if not the informed older physician? With patience and tolerance borne of long acquaintance with every type of patient, with knowledge borne of many trying events, with experience in every type of case, hospital, scientific study and probable danger, he is in a position to be of lasting benefit to his junior. As the parent, so the senior physician can shape and guide and build and create so that the result in the young physician, grown to maturity, will be one of young scientific knowledge, tempered by old wise experience.

But let him be careful not to use the parental methods of half a century ago. Let him avoid the pitfall of brash and crass wordage, that I-am-older-than-you-and-therefore-know-and-say attitude which will bring him certain defeat. Let the senior physician be understanding. Let him remember his own youthful experiences, his youthful successes, his youthful defeats. Let him recall his own disillusionment at the lengths to which duty goes in calling upon the physician for public service and let him ever make it clear that it is never to be considered as a burden. Let him, through understanding, serve his junior physician and all mankind.

Let the senior physician be subtle. A scientific attitude requires open-mindedness and tolerance of large measure. Only through subtlety will this attitude be continually cultivated to greater and greater heights until it reaches the pinnacle of true service. So much more will be accomplished through the gentleness of subtlety than through the harshness of hard and cold untempered fact.

Let the senior physician feel called on more than ever to exercise his common sense. Let him realize he must not look back but ahead. He must not think in terms solely of the past. He must look to the future, knowing that the young physician will one day supersede him. Let him prepare for that day by revealing no weakness of personal character in learning from the junior, all the while he is teaching the latter the craft of the senior. Let him tax his reason to yield ever to the exigencies of the moment.

All these traits bear manifold relations to patient and physician, to student and practitioner.

Since we have had organized medicine we have made more progress and the science of medicine has reached a higher plane than was possible had each one continued in his isolated and selfish life. It is my belief that we are outstripping all other professions in progress and development today.

We are ever looking forward and blazing the trail for others

The benefits given by the medical profession to the general welfare are but little understood and less appreciated. Where would we be today if medical science had done nothing toward the control of smallpox, diphtheria, typhoid fever and malaria? What would happen if the doctors went on a sit-down strike for ten years?

If the following achievements are realized by the medical profession the life span will be lengthened still further the further control and mastery of the remaining infectious diseases an understanding of the factors that produce diseases of the heart and blood vessels, and the solving of the mystery of cancer and its cure. It is not an unfounded hope that makes me believe that these conquests will be realized some day. By the actual progress of investigations in physics, chemistry and biology now under way the problems presented by these great outstanding menaces to mankind are already partly solved. Their further solution depends on the continuance of scientific work, together with public education.

But let us be alert. Let us beware of pitfalls. There are wolves in sheep's clothing who would have us import some European system of medical care, with its paternalism, its regulation and its regimentation of both physicians and public, which, to my mind, are not in accordance with the American way of life. While dangling in plain view the bait of free medical service they hide the concomitant necessity of compulsory sickness insurance out of the poor man's pay envelope, to cover not only the cost of medical care but the added expense of another bureau

of regulators which would approximate if not exceed the Post Office Department in size and expense of personnel.

May we escape further centralization of power in this free nation? Propaganda in favor of taking the practice of medicine out of the hands of physicians and turning it over to be controlled by the politicians has been vociferous and without ceasing. A steady barrage of newspaper items, magazine articles, radio addresses and speeches has been aimed at the medical profession by these proponents of state medicine, with the obvious intention of breaking down the confidence of our patients in our trustworthiness.

Have we ever played into the hands of these gentlemen by what may have appeared to the patient and his family to have been a lack of sympathy, callousness or perchance, the highly mercenary attitude? I wonder.

But I am talking too long. With this word I come to my conclusion. You remember that old custom of the monks of Aberdale. When they came to a house and asked for alms or food or shelter, if it was denied to them they were wont to raise their hands with cursing gesture and their voice in *Maledicite maledicite*. But if they received their dole, the gesture was reversed and in their softest tones they spoke their gratitude in *Benedicite benedicite*. Thus, it must be those who do know you who judge you wrongly and howl maledictions. I who have known you, who have felt of your favor who have been warmed by your kindness—I who have gained a new respect for your power and an even greater confidence in your gentleness—I pronounce my humble but, believe me my heart felt, *Benedicite benedicite*.

REPORT ON MEDICAL PROGRESS

ELECTROCARDIOGRAPHY IN GENERAL MEDICINE*

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WITH the increasing availability of the electrocardiograph, every physician, general practitioner and specialist alike has occasion in these times to utilize this laboratory aid to cardiac diagnosis. One cannot hope to be truly adept at electrocardiographic interpretation without a considerable amount of study and experience, but every doctor should be able to answer these questions, What information will the electrocardiogram furnish, and what are its limitations? He should know when to demand an electrocardiogram in order to obtain vital information regarding his patient, and when a tracing is unnecessary or useless.

This article will endeavor to answer these questions. No attempt will be made to provide a résumé of electrocardiographic interpretation, there are several excellent texts which cover the subject adequately. Certain of the recent advances in electrocardiographic interpretation will, however, be mentioned.

With the development in 1903 of the delicate string galvanometer by the physiologist Einthoven, of Leyden, a new weapon was added to the armamentarium of those interested in the diagnosis and treatment of heart disease. Originally introduced as a laboratory aid in the study of the physiology of the heart, the electrocardiograph was quickly taken up by cardiologists, and soon became almost the hallmark of their special craft. In recent years, however, internists and general practitioners have to an increasing extent added it to their laboratory equipment. Although the bounds of its usefulness have, no doubt, not yet been fully explored, its value and its limitations are now fairly clearly defined, and at the present time the danger is not so much that electrocardiographic abnormalities will be missed by physicians not highly experienced in electrocardiographic interpretation, as that they will seek to use it beyond its limitations as an all-seeing eye for cardiac diagnosis, and will fail to correlate electrocardiographic

findings properly with the clinical state of their patients.

The basic principle of the electrocardiogram is simple. Whenever a cell is activated, be it one which conveys a nerve impulse or a muscle cell which contracts, a difference in electrical potential is set up between the activated portion of the cell and the resting part, which can be detected by placing electrodes on the cell and registering the electrical changes by a sufficiently delicate galvanometer. Where a great number of such cells are involved, as in the heart as a whole, the record which is obtained is a summation of these electrical stresses registering in succession the phases of the cardiac cycle. The magnitude of the changes is a measure of the degree of unbalance of the stresses, and is not a measure of the mechanical force of the heart beat. Indeed, the point at which the heart is contracting most forcibly, that is, the peak of ventricular systole, may coincide with a point on the electrocardiogram where there is no deflection whatsoever. It is obvious, therefore, that only those conditions within the heart that produce electrical changes will be registered on the electrocardiogram, hence its usefulness will be limited within these bounds.

The type of electrocardiographic machine based on the string galvanometer introduced by Einthoven is still in use, but in addition the oscillographic type of machine, depending on the amplification of the minute electrical current by vacuum tubes, is now also very widely employed. A source of light conveys the image of the moving string or of the galvanometer mirror, to be registered on a moving photographic film. In addition, a time marker is usually introduced, so that there is direct photographic registration of time intervals of 0.04 and 0.20 second. Horizontal bands on the film permit the standardization of the record for each patient, so that a deflection of the string of 1.0 cm. is equivalent to 1.0 millivolt.

In taking electrocardiograms in clinical practice the electrodes are placed on certain arbitrarily chosen portions of the body with the heart lying between them, the body thus acting as a passive

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conductor In order to obtain the maximum recording of electrical changes taking place in different directions, three successive arrangements of electrodes or leads are taken, labeled Leads 1, 2 and 3, and known as the standard leads Lead 1 is obtained by connecting an electrode placed on the right arm to one on the left arm Lead 2 extends from the right arm to the left leg, and Lead 3 extends from the left arm to the left leg A triangle is thus formed enclosing the heart in three directions Since the electrical axis of the heart normally lies nearly parallel with the axis of Lead 2, the various waves of the electrocardiogram tend to be higher in this lead than in Lead 1 or 3

It will be noted that although the axes of the three standard leads cut the heart in different directions, they all lie in the frontal plane. Now, the heart being a three-dimensional organ it must often happen that disturbances occur within it which would be registered only by electrodes placed along an anteroposterior axis It would seem offhand that electrodes so placed that one was situated on the chest in the precordial area and the second directly behind it on the back would register this axis as desired. This is not exactly the case, however, because of the position of the heart in essential apposition to the anterior chest wall, while separated from the back by a comparatively thick layer of rather poorly conducting lung tissue. Since the registration of electrical disturbances is in inverse proportion to the distance from the electrode, it is obvious that the electrical changes produced in the neighborhood of that portion of the heart lying beneath the anterior electrode will dominate in producing the resultant electrocardiographic pattern The chest leads therefore tend much more to localize than they do to depict the general composite pattern of the electrical changes occurring throughout the heart

Chest leads have come into general use in clinical electrocardiography since the demonstration in 1932 by Wolfarth and Wood¹ of their value in the diagnosis of fresh cardiac infarction Since they are especially useful in detecting focal lesions they are of particular help in revealing this condition, but their value is by no means limited to this state, and it is now the general practice to include a chest lead (Lead 4) in every electrocardiographic tracing

As study of the technic of the chest lead progressed, it was soon found that a part of the body such as a leg or an arm would serve as well

as the back for the indifferent electrode, and therefore, for the sake of convenience, the left leg or the right arm is now generally employed The chest electrode is usually placed over the apex of the heart and the resulting leads are labeled Lead 4F or Lead 4R, depending on whether the left leg or the right arm is used for the indifferent electrode Occasionally other precordial leads are utilized Standard criteria for the taking and naming of these chest leads have recently been established by a joint committee of the American Heart Association and the Cardiac Society of Great Britain and Ireland²

THE NORMAL ELECTROCARDIOGRAM

In order to understand what the electrocardiograph is capable of doing and what one should not ask of it, a brief description of the normal electrocardiogram is necessary This consists of several component parts, representing the successive phases of the cardiac cycle Each wave or

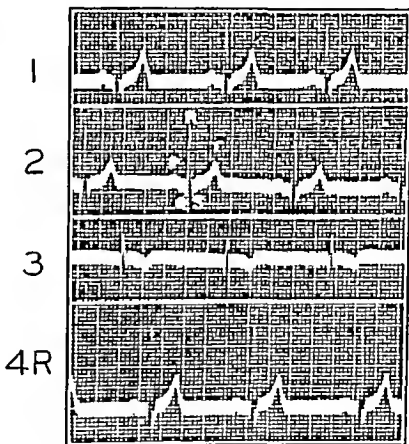


FIGURE 1 Normal Electrocardiogram

Slight sinus arrhythmia rate approximately 60 P waves upright in Leads 1, 2 and 4 not visible in Lead 3 PR interval = 0.14 second QRS interval = 0.09 second T waves upright in Leads 1, 2 and 4 inverted in Lead 3 axis normal

deflection from the isoelectric base line signifies a change in electrical potential produced by the spread of an impulse of excitation or the contraction of the cardiac muscle. To these successive waves the letters P, Q, R, S and T are applied (Fig 1)

The initial deflection, the P wave, is produced

by the spread of the wave of excitation from its origin in the sinoauricular node through the auricles and the contraction of these chambers. It is normally upright, in Leads 1 and 2 at least, and of small amplitude and short duration, and frequently is invisible in Lead 4 and even in one or two of the standard leads. If it is absent in all leads, however, it indicates that the auricles are not beating, as, for example, in the case of auricular fibrillation.

The PR interval, or the time interval from the beginning of the P wave to the commencement of the QRS complex, gives a measure of the speed of conduction between the sinoauricular and auriculoventricular nodes, and is usually between 0.14 and 0.16 second, with an upper limit of normal of 0.20 second or somewhat less,³ depending on the age and size of the patient and the heart rate. When the PR interval exceeds the normal, partial heart block is present, this may be due to abnormal vagal stimulation, toxic damage or disease of the conducting mechanism. If greater interference with the conducting mechanism occurs, certain of the auricular impulses may be completely prevented from reaching the ventricles, resulting in dropped beats or 2 1, 3 1, 4 1, or complete auriculoventricular heart block.

Ventricular activity commences with the QRS complex. The wave of excitation spreads from the auriculoventricular node down the bundle of His and its right and left branches and through its arborizations to the ventricular muscle. The mass of tissue in the bundle of His and its main branches is probably too small and the speed of conduction too rapid to be registered to any extent on the electrocardiogram. The QRS complex, mainly at least, represents the invasion of the muscle by the excitation waves. The R wave is always upright, if the initial deflection is downward this portion is called a Q wave and if a downward deflection follows the R wave it constitutes an S wave. Normally the predominant wave in all leads is the upright R wave, and the Q and S waves are small and frequently missing altogether. The contours of the waves of this complex are normally sharp, and the total duration does not exceed 0.10 second. When the QRS interval is longer than this, damage to the conducting mechanism, known as intraventricular block, has occurred, and when these abnormal waves have a characteristic pattern it can be inferred that the delay is mainly in either the left or the right bundle. The maximum amplitude of the Q, R and S waves in the standard leads, which in normal persons means the R wave, is higher than

either that of the P or the T wave, and is 0.5 millivolt or greater. If the maximum amplitude is less than this in all the standard leads, it suggests that myocardial disease is present, although in the absence of other electrocardiographic abnormalities it is unwise to diagnose heart disease from this sign alone. A certain percentage of normal persons show a minor degree of low voltage, possibly due to the position of the heart in the chest. Among other causes of low voltage in persons with normal hearts are pulmonary emphysema, generalized edema and effusions into the abdomen, chest and pericardium. Myxedema may produce such low amplitude, and a possible cause of finding low voltage erroneously is an improper standardization of the leads, especially in patients with high skin resistance (when the string-galvanometer type of machine is used).

When the S wave is more prominent than the R wave in Lead 3, the electrical axis of the heart, which very roughly corresponds to the anatomical axis, has been shifted to the left, or lies more nearly horizontally. If extracardiac causes for such a shift are excluded, the deviation usually represents a relative enlargement of the left ventricle, such as is seen in patients with hypertension or aortic regurgitation. If, on the contrary, the S wave is greater than the R wave in Lead 1, right-axis deviation is present, and is suggestive of relative right-sided cardiac enlargement, such as, for example, occurs with mitral stenosis or cor pulmonale.

The active phase of ventricular muscular contraction commences with the subsidence of the QRS deflections and is represented in the normal electrocardiogram by an isoelectric period, followed by a wave which is upright (except occasionally in Lead 3), the T wave. Ventricular systole ends and diastolic relaxation commences at or before the apex of the T wave. In pathologic states the normally isoelectric ST interval may be elevated above or depressed below the base line. Except when the QRS complex itself is markedly abnormal, or when there is a marked degree of axis deviation, significant degrees of such elevation and depression are usually associated with acute injury to the heart, and are mainly seen in patients with acute myocardial infarction or pericarditis.

The T wave, which normally has an amplitude of 0.1 to 0.5 millivolt, may become flattened or inverted under certain circumstances usually associated with toxic damage, ischemia or disease of the ventricular myocardium. Normally the T wave in Lead 3 is frequently flat or inverted.

The total duration of ventricular systole is roughly computed to the electrocardiogram from the QT interval, the normal limits of which vary with the heart rate and to some extent with the sex of the patient.⁴ This interval may be prolonged as the result of heart disease, but also may be lengthened as the result of toxic states, as in uremia, or through the effect of quinidine

VALUE OF THE ELECTROCARDIOGRAM

Bearing in mind what the electrocardiogram really is and what it registers, it will be of assistance in the diagnosis of pathologic cardiac conditions by demonstrating the following conditions

- I Disturbances of rhythm
- II Disturbances of conduction
 - (a) Between auricles and ventricles (auriculoventricular block of varying degree)
 - (b) Within the ventricles (intraventricular and bundle-branch block)
- III. Shift of the electrical axis of the electrocardiogram as the result of
 - (a) Relative enlargement of one or more chambers of the heart
 - (b) Displacement or rotation of the heart within the thoracic cavity
- IV Damage or disease of the myocardium as the result of
 - (a) Toxic damage or infection
 - (b) Coronary disease and myocardial ischemia
 - (1) Acute myocardial infarction
 - (2) Chronic coronary disease
 - (c) Acute pericarditis
 - (d) Pulmonary embolism

These will be considered in the following paragraphs.

Disturbances of Rhythm

Cardiac arrhythmias can usually be diagnosed by the electrocardiogram with a high degree of accuracy, and the polygraph has been almost entirely replaced in clinical use by the electrocardiograph for this purpose. Of course, many of the arrhythmias can easily be diagnosed at the bedside by palpation and auscultation, although one's adeptness at such bedside diagnosis is greatly enhanced by the check of an electrocardiogram. However, there are certain conditions which can be distinguished clinically with the greatest of difficulty or not at all, and they often carry very different indications for treatment. Thus it may be very hard to tell whether one is dealing with auricular fibrillation or numerous premature contractions, or even, on occasion, with sinus arrhythmia, and it is impossible clinically to judge whether extra

systoles arise from a single focus or multiple foci, although the latter are much more important. Paroxysmal auricular and ventricular tachycardia can be differentiated only by the electrocardiogram, and both are easily confused clinically with auricular flutter with 2:1 block, and with a rapid sinus tachycardia. Complete heart block and sinus bradycardia may be clinically indistinguishable, and high-grade partial heart block with a regular ventricular rhythm may be missed altogether clinically.

Disturbances of Conduction

Auriculoventricular block Partial heart block resulting merely in a prolonged auriculoventricular block conduction time can only be diagnosed by the electrocardiogram or the polygram. The greatest importance of this finding as a diagnostic sign is in connection with rheumatic fever. At least 30 per cent of all patients with active rheumatic infection show a prolonged PR interval at some time during the course of the disease. This occurs quite irrespective of whether or not endocardial lesions develop. Since this electrocardiographic sign is so common in rheumatic fever and so rare in other types of arthritis, it is frequently of great help in establishing a diagnosis of this disease, which is very often obscure in its manifestations. Moreover in those cases in which partial heart block is persistently present, the electrocardiogram furnishes a valuable guide as to the duration of activity.

Many other conditions can of course produce prolonged auriculoventricular conduction. Digitalis is perhaps the commonest cause, and the presence of partial heart block, together with other electrocardiographic signs of digitalis toxicity, may provide a helpful indication as to whether the patient has had too little or too much digitalis.

Any type of heart disease may produce transient or permanent partial block, provided the lesion is so situated as to interfere with auriculoventricular conduction. It is not, however, very commonly found as a permanent manifestation of chronic heart disease. It frequently does occur transiently in acute myocardial infarction of the posterior type, due usually to thrombosis of the right coronary artery. About 15 to 20 per cent of cases of posterior infarction show prolongation of the PR interval, and in about 3 per cent higher grades of heart block are present.⁵ Such prolongation may be the only electrocardiographic sign of cardiac infarction.

Higher grades of heart block ranging from dropped beats to complete block, are merely ac-

centuations of partial heart block of the type discussed above and are due to precisely the same causes

Intraventricular and bundle-branch block Intraventricular and bundle-branch block can only be diagnosed with certainty by the electrocardiogram. The terminology and exact electrocardiographic diagnostic criteria for the various types of bundle-branch block have undergone a good deal of modification during the past few years. It is probably wisest at the present time to adopt the criteria laid down by the New York Heart Association.⁶

Bundle-branch block is a nonspecific sign, but is usually the result of chronic organic heart disease. In occasional cases, however, it may be temporary as the result of some toxic effect on the heart or may be produced by coronary thrombosis, or, in rare cases, it may be functional. Although permanent bundle-branch block may be rarely produced by some static focal lesion in a heart otherwise undamaged, in most cases it is an indication of widespread and progressive cardiac damage, and hence its discovery is a relatively serious prognostic sign. However, if the patient survives a year after the discovery of this electrocardiographic abnormality, his prognosis would seem to be considerably improved, since the block is then much more likely to be due to a focal lesion.

Records which show a very minor degree of prolongation of the QRS interval (0.11–0.12 second), especially when associated with high voltage and if unaccompanied by other electrocardiographic abnormalities, may prove very confusing and difficult of interpretation, under such conditions one should avoid a dogmatic interpretation, but should consider the record only in the light of the clinical findings.

One type of bundle-branch block which deserves special mention, because it has only recently been described and because it carries with it a favorable prognosis, is bundle-branch block associated with a short PR interval (0.10 to 0.12 second), occurring in patients with otherwise normal hearts who may be subject to attacks of paroxysmal tachycardia or fibrillation.⁷ Interestingly enough, these individuals usually show normal QRS complexes during the periods of tachycardia, and normal complexes can frequently be induced at other times by the administration of large doses of adrenalin or atropin. The electrocardiograms of this type are usually distinguished by a slurring of the upstroke of R₁, a finding rarely if ever

present in organic bundle-branch block where the delay is in the down stroke. The probable cause of this functional condition is an accessory pathway of conducting tissue between auricles and ventricles (bundle of Kent) which conveys the impulse with great rapidity to a point below the auriculoventricular node. The following case history is cited as an example of this condition and also as an illustration of the harm that a wrong electrocardiographic interpretation can do.

The patient, a 23-year-old student, had had an "attack" a year previously in another city, which consisted of faintness, palpitation and tachycardia, some dyspnea and mild precordial oppression. It had come on while he was playing ball and had lasted about 3 hours. By the time he was seen by his physician, the acute phase of the attack had passed off but his heart was still rapid and irregular. His past history and family background were negative as to any pertinent facts. His physician called a consultant, who saw him at a time when his heart was once more slow and regular. Two electrocardiograms were taken at intervals of a few days, and, apparently largely or entirely on the basis of the electrocardiographic interpretation, a diagnosis of acute myocardial infarction was made. Bed-rest was carried out for several weeks and the patient was then gradually allowed to resume full activity. When I saw him a year later he was feeling quite well, except for the natural anxiety occasioned by the serious prognosis he had been given. At this time a further history of transient attacks of rapid palpitation on two or three occasions, occurring during the course of physical activity, was elicited. Physical examination and x-ray measurements of the heart were completely normal. An electrocardiogram showed left bundle-branch block with slurring of the upstroke of the R wave and a PR interval of 0.11 second. Comparison of the two previous records with this tracing showed them to be essentially the same, since they differed from each other only in minor details of the QRS and T waves. An attempt to change the form of the ventricular complexes by the administration of atropin was unsuccessful, but following the intravenous injection of a very small amount of adrenalin perfectly normal QRS complexes were produced for a few minutes.

It seems quite certain that this young man had the type of bundle-branch block described above, and that the attack which he had suffered a year previously was a paroxysm of auricular tachycardia or fibrillation. The unfavorable prognosis he received was quite unjustified. Much harm could have been averted had the original electrocardiogram been correctly interpreted and the clinical symptoms properly evaluated.

Shift of the Electrical Axis

Frequently but by no means invariably, enlargement of the left ventricle is accompanied by left axis deviation, while right-sided enlargement results in right-axis deviation.

The same findings, however, that occur with cardiac enlargement may, to a certain extent at least,

take place when the position of the heart within the chest is shifted by extracardiac conditions such as high diaphragm, fluid or air in the pleural cavity, or collapse or fibrosis of the lung. With a marked degree of left ventricular enlargement it is not uncommon to find the ST interval slightly depressed in Lead 1 and raised in Lead 3, with an inverted T_1 and an upright T_3 . This pattern is not found when the heart is simply displaced upward and outward by a high diaphragm. Under these circumstances the ST intervals are isoelectric, and the T waves upright, although T_2 may be inverted on occasion.

Myocardial Damage or Disease

Resulting from toxic damage or infection These changes, which are often associated with disturbances of auriculoventricular or intraventricular conduction and with shifts in the electrical axis, are frequently nonspecific so far as the electrocardiographic pattern is concerned. They are manifest by flattening or inversion of the T waves, deviation of the ST interval above or below the isoelectric base line, prolongation of the QT interval and diminution of the voltage of the QRS complexes. These abnormalities may be present singly or in a variety of combinations. Digitalis, for example, typically produces a characteristic spoon shaped inversion of the T waves, whereas quinidine tends to lengthen the QT interval. The QT interval may also be prolonged as the result of toxic states such as uremia and other types of acidosis, in beriberi heart disease, as well as in hypertensive or arteriosclerotic heart disease. Depression of the ST interval with flattening or inversion of the T waves in one or more leads is also seen in beriberi heart disease,⁸ as well as in some cases of severe anemia,⁹ and according to Scherf,¹⁰ the same pattern is commonly found in electrocardiograms of women at the menopause. Severe myxedema typically produces a low voltage in all complexes, and low voltage is also found in myocardial disease of various types. Minor degrees of it may occur in apparently normal people, as has been mentioned above, so that not much reliance should be placed on this sign alone if present only to a slight degree and unaccompanied by other abnormalities.

Resulting from coronary disease and myocardial ischemia The greatest clinical value of the electrocardiogram undoubtedly lies in the information it provides that enables us to diagnose acute myocardial infarction usually associated with coronary thrombosis. The electrocardiographic pattern is often characteristic, and frequently the diagnosis

can be made with certainty from a single record. Yet even here a word of caution is in order against interpreting the electrocardiogram without considering the clinical picture. Even the characteristic pattern of myocardial infarction may be confused with that produced on occasion by pulmonary embolism or by acute pericarditis. Not infrequently atypical changes occur, or the record may be taken either before marked changes have had time to be produced or after they have progressed to the stage when they are no longer specific for an acute lesion. Under these conditions serial electrocardiograms may furnish the information which a single tracing fails to reveal.

In general, the majority of electrocardiographic records taken on patients with a large acute myocardial infarction fall into either the Q_1T_1 or Q_1T_2 type, signifying a so-called anterior or "posterior" infarction.¹¹ These patterns have been well described in the literature as well as in the recent editions of textbooks on electrocardiography, and will not be given here.

Recently the electrocardiographic changes which are found in so-called "lateral infarction" have been described.¹² These consist of depression of the ST segments in Leads 1 and 2 as well as in the precordial lead, especially when the last is placed over the apex. These patients frequently have auricular fibrillation and hence are likely to have received digitalis, which may produce electrocardiographic changes very similar to those resulting from lateral infarction. Moreover, the changes in this type of infarction may disappear rapidly and completely.

As mentioned above, atypical electrocardiographic abnormalities occur which conform to none of the above mentioned patterns. In some cases they have characteristics of a combination of anterior or posterior lesions, while in others they are quite nonspecific and only the changes taking place in serial records, combined with the clinical findings or the autopsy correlation demonstrate that they are in reality due to an infarction. It is not surprising that atypical patterns are sometimes found because not only is the muscular structure of the heart complex, but extraordinary changes in the coronary circulation may take place, with a very varied clinical picture.

It is hazardous to make a prognosis from the electrocardiographic evidence in cases with myocardial infarction. Sometimes one can find evidence that progression of the thrombosis or a new infarction has taken place by the recurrence of acute changes, and, in general, patients whose records show a marked improvement and a return

toward normal within a short period of time have a less severe focal lesion than those whose records do not. But even here prognosis has to be guarded, because one never knows how much disease there may be elsewhere in the heart and the coronary arteries or when another thrombosis will take place.

Electrocardiographic abnormalities which occur as the result of chronic myocardial ischemia secondary to coronary disease may have resulted from an acute cardiac infarction in the past or from slowly developing coronary insufficiency. It is sometimes possible that an acute incident did occur at some time in the past, but on the whole the findings are nonspecific and similar to those resulting from myocardial damage of toxic or infectious origin.

Characteristic traces of cardiac infarction may persist in the electrocardiographic record for the rest of the patient's life. On the other hand, an infarction, and particularly repeated infarctions, may result in a nonspecific abnormality of the electrocardiogram which is indistinguishable from that produced by diffuse myocardial fibrosis secondary to coronary disease without gross infarction—or, indeed, from toxic or infectious myocardial damage.

Resulting from acute pericarditis In recent years a number of articles have been written describing the electrocardiographic changes which may occur in the course of acute pericarditis.^{13, 14} The most striking change that may take place is an elevation of the ST interval in some of or most characteristically in all the three standard leads, and often in the precordial lead as well, especially if it is taken from the right arm to the apex. These electrocardiographic changes are especially apt to be present in purulent pericarditis or hemopericardium, but they may occur in any type of acute pericarditis. They are often present only during the first few days of the pericarditis, and may then disappear in spite of the continuance or progression of the pericardial disease. Changes in the T waves may also occur, these may follow the alterations in the ST segment or may be seen as the initial manifestation. They consist of inversions which occasionally occur in all three standard leads as well as the chest lead, a finding rarely seen in any other condition.

The electrocardiographic abnormalities which are found in acute pericarditis were originally thought to be due to the pressure of the accumulating pericardial fluid exerting a tamponade effect on the heart. Though this may possibly be true in a few cases which show very rapid and marked accumulations of fluid, the more probable explanation in most cases is that they are due to a super-

ficial subepicardial myocarditis, which occurs as the result of the penetration of the pericardial inflammatory process into the superficial layers of the heart.

Since pericarditis is often missed clinically, and since it is so important that purulent pericarditis be diagnosed early and correctly, the electrocardiogram offers a means by which this diagnosis can be made in a considerable percentage of cases.

The condition with which the electrocardiographic changes of acute pericarditis are most often confused is acute myocardial infarction. Although the patterns in the two conditions are in many ways similar, if it is borne in mind that characteristically the ST interval alterations and sometimes the T-wave changes of pericarditis involve all three standard leads, and that changes in Q waves are absent, mistakes in diagnosis are not likely to occur often. It should be remembered that pericarditis may occur in the course of myocardial infarction, and that hence the electrocardiogram may reflect both conditions.

Resulting from pulmonary embolism In 1935 McGinn and White¹⁵ described a characteristic electrocardiographic pattern occurring in certain cases of pulmonary embolism. This consists of the appearance of a prominent S₁ and Q₃, a depression of ST₁ and ST₂ with staircase ascent, and an inversion of T₃ with upward convexity of ST₃. Since the publication of their article a number of reports on this subject have appeared, the latest of which, by Sokolow, Katz and Muscovitz,¹⁶ not only comprises a relatively large series, but also well summarizes the present status of this rather controversial subject. In brief, out of 50 cases they found 5 which fulfilled McGinn and White's criteria. In 9 there were no significant electrocardiographic changes. Twenty-seven showed nonspecific changes, which for the most part consisted of one or more of the abnormalities described by McGinn and White, and in 9 there were present some of the characteristics of recent myocardial infarction, usually of the posterior type. The absence of the full blown picture of myocardial infarction, the failure of the T-wave changes to evolve through a characteristic sequence of changes and the tendency for the abnormalities to disappear made the differentiation from cardiac infarction possible in the majority of cases. There was no correlation between the type of electrocardiographic changes encountered and the nature or extent of the pulmonary infarction.

LIMITATIONS OF THE ELECTROCARDIOGRAM

There are certain questions which the electrocardiogram will not answer. The two most im-

portant are the presence or absence of valvular disease, and the degree of impairment of the cardiac reserve. Since the valves neither convey neurogenic impulses nor have muscle, there is no direct registration of their action on the electrocardiogram. The only evidence that the electrocardiogram ever gives of valvular disease is the indirect evidence suggesting relative enlargement of certain chambers of the heart, which may occur characteristically in various types of valvular disease. The question that is so frequently asked, for example, "This patient has a systolic murmur—does he have mitral disease?" cannot be answered.

The electrocardiogram tells us nothing about the functional capacity of the heart. We cannot judge from it whether a patient is suffering from congestive heart failure or from angina pectoris. A man may be dying from heart failure and still have a normal electrocardiogram and contrariwise he may show a most abnormal record and still be capable of normal activity. It cannot be emphasized too strongly that an electrocardiogram should not be isolated and considered out of relation with the patient himself. As with all information gained in the laboratory, an electrocardiographic interpretation should always be as assessed in the light of the clinical findings.

There are three general types of error which frequently occur when such a clinical correlation is not properly made. First, a normal electrocardiogram may be found in a person who has organic heart disease, and because undue weight is laid on it the correct diagnosis is missed and the patient is improperly treated. Second, an incorrect diagnosis of serious heart disease may be made on the basis of the electrocardiogram alone which has been wrongly interpreted as being pathologic when actually all that was present was artefact, or minor physiologic variation, or change which might be either functional or organic in nature. Third, nonspecific electrocardiographic abnormalities may be wrongly interpreted.

Many of the abnormalities which the electrocardiograph records are nonspecific—that is, they may be produced by any of several disease processes or toxic effects acting on the heart. Moreover certain deviations from the normal which the electrocardiogram may show may be merely extremes of physiologic variations. With the exception of

a very few pathognomonic electrocardiographic findings, mainly concerned with arrhythmias, and to some extent with acute myocardial infarction, an electrocardiogram can be intelligently interpreted and its significance properly evaluated only by considering it in relation to the whole clinical picture and other laboratory findings. Considered in this way the electrocardiogram offers much that is of value. When it is taken out of its context and too much stress is laid on it the dangers resultant from an unwise interpretation are as great as is the helpful information it provides.

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Erratum. In the "Report on Medical Progress Pathology," by Dr. Tracy B. Mallory, in the May 30 issue of the *Journal* the sentence starting on line 17 of column 2 on page 924 should read as follows:

The rate of healing was found to be inversely proportional to the size of the infarct and directly proportional to the adequacy of the remaining coronary circulation.

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED
IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26261

PRESENTATION OF CASE

A fifty-six-year-old Danish housewife was admitted to the hospital for study

The patient had enjoyed good health until two years before admission when several of the following symptoms appeared almost simultaneously. Possibly the first symptom in its order of appearance was that of pain in the lower thoracic region of the spine, which radiated forward toward the midline beneath the breast on the left side. She complained of "sticky" pains over the left chest anteriorly, occasionally precordial, lasting sometimes five minutes and accompanied by palpitation and shortness of breath. Dyspnea with exertion was noted from such bland acts as walking slowly out of doors or bending over while at work in her home. Hair appeared on the upper lip and became quite noticeable, as did that on the side of her face, at the same time the hair on her head came out in "bunches." Approximately one and a half years before admission she began to notice flushing of the face and neck and the skin showed eruptions which appeared to have been acneform. All these symptoms persisted and increased in severity. It then became difficult for her to talk. She became worried about her symptoms and a physician was called.

Roentgenograms of the chest showed cardiac enlargement. The physician then prescribed "green pills," which she continued taking until one week before admission. She was sent to an outside hospital four months before admission, where she stayed for more than two months and was then referred to a sanatorium. During this time edema of the ankles appeared and her eyes began to "water." She was referred from the sanatorium to this hospital for further study.

The patient came to the United States at the age of eighteen. She had had the usual childhood diseases, but no scarlet fever or diphtheria. At the age of twenty-two she had had typhoid fever, with an uneventful recovery. There had been no other illnesses of any significance. The patient

weighed about 144 pounds, and there had been no recent change. Catamenia began at the age of sixteen, occurred once every twenty-eight days, lasted one week and tended to be profuse. She had had the menopause at the age of forty-five. There had been no discharge or bleeding since that time. She had been married at the age of twenty-seven and had had six children, one of whom died at an early age of heart disease. The remaining children and husband were living and well. The family history was negative.

Physical examination revealed a short, stocky woman whose face, neck and upper thoracic regions were flushed. The hair was soft, fine, sparse and greasy. There was a rough, stubby growth of hair over the face, upper lip and chin, where the patient had recently shaved. No abdominal striae were noted. The skin showed multiple acneform lesions over the upper chest anteriorly. The heart was somewhat enlarged to the left. The signs were muffled, and no definite murmurs were audible. The blood pressure was 170 systolic, 100 diastolic. There were rales at both lung bases. The spleen was just palpable with the patient on the left side. There was a right dorsal, left lumbar scoliosis. Examination of the genitalia revealed that the mucous membranes were "highly colored." There were many redundant vaginal folds, and because of this the cervix was not visualized. The clitoris was slightly larger than normal. The visual fields were normal. The fundi were not well observed. The neurological examination was negative.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red-cell count of 5,500,000 with 78 per cent hemoglobin (Sahli), and a white-cell count of 11,400 with 65 per cent polymorphonuclears, the smear was normal. Examination of the urine was essentially negative. The plasma volume was 2554 cc, or within normal limits, and the extracellular fluid volume was 12,370 cc, a low normal. The weight was 139 pounds. A blood Hinton test was negative. The blood sugar was 110 mg per 100 cc, the plasma nonprotein nitrogen 26 mg, the serum calcium 9.7 mg, the serum phosphorus 3.2 to 4.0 mg, and the serum phosphatase 5.24 units. A glucose tolerance test by the venous capillary method, using the macro and micro techniques, showed an elevated flat curve during the four hour interval of the test. The urinary samples taken during the last two, three and four hours

showed yellow-brown and green tests with Benedict's solution. The second, third and fourth blood macro tests on the blood gave readings of 412, 304 and 250 mg per 100 cc. respectively. The micro tests were similarly elevated. The phenolsulfone phthalein test showed 40 per cent excretion in thirty minutes and 65 per cent in one hour. The plasma chlorides were equivalent to 102 cc. of N/10 sodium chloride per liter, the carbon dioxide combining power was 74.0 vol per cent, the total cholesterol 144 mg per 100 cc., and the serum sodium 147.9 milliequiv per liter. A urinary female sex hormone test was slightly positive. An electrocardiogram showed a ventricular rate of 85 with frequent auricular premature beats, a PR interval of 0.14 second, a QRS duration of 0.12 second, left axis deviation and left bundle-branch block.

Roentgenograms of the spine showed marked scoliosis of the upper dorsal spine to the left and of the lower dorsal spine to the right, with corresponding deformity of the rib cage. Chest plates showed the diaphragms high in position, particularly on the left, with the heart in the transverse position. The heart was enlarged in the region of the left ventricle. There was a markedly tortuous, elongated aorta without gross dilatation. The lung fields were clear. The visible bones appeared decalcified. There was marked development of the subcutaneous fat. A flat film of the abdomen showed the left kidney displaced markedly downward and located so that it was seen end on. The displacement was produced by a round 15-cm soft-tissue mass which occupied the place between the displaced kidney and the diaphragm. The spleen was displaced laterally. In the lateral view about three fourths of this tumor lay in the front of the spine and one fourth lateral or posterior to the lumbar vertebral bodies, the posterior aspect of the tumor lying against the descending posterior part of the diaphragm. After intravenous injection of dye there was prompt excretion on both sides. The kidney pelvis appeared to be normal. A film of the skull showed no gross evidence of disease. In roentgenograms following air injection the right perirenal tissues and adrenal gland were fairly well visualized. The adrenal gland appeared slightly larger than normal, and its density was approximately that of the kidney. On the left there were comparatively small amounts of air visible surrounding the kidney, as well as a tumor mass in the region of the

adrenal gland. The mass was separated from the diaphragm by air with the exception of a small space in the center of the diaphragm. The mass appeared lateral and anterior to and well separated from the spleen. By a gastrointestinal series, the mass displaced the stomach forward and slightly toward the right. Occasionally the stomach was displaced even more laterally, thus showing that it was not adherent to the mass though it must have been in close contact.

Further data obtained while in the hospital revealed that the patient had suffered with paroxysmal nocturnal dyspnea, ankle edema and precordial pain that was brought on by effort, especially after meals, and was relieved by rest. These symptoms were associated with dyspnea and were minimal after the three months period of hospitalization before admission. The patient was placed on $1\frac{1}{2}$ gr of digitalis daily, was given intravenous Salyrgan twice each week and treated with bed rest. She continued to show rales at both lung bases, but there was no evidence of peripheral edema. The blood pressure remained around 170 systolic, 90 diastolic. A tourniquet test performed with the blood pressure at this level showed no petechiae on immediate release of the tourniquet.

Approximately one month after admission a right adrenal exploration was performed. A very small normal adrenal was found and biopsied. The postoperative course was uneventful. Some two weeks later left adrenal exploration was performed.

DIFFERENTIAL DIAGNOSIS

DR. AUBREY O. HAMPTON: You can see this large mass in the lateral view displacing the stomach forward and medially. The intravenous pyelogram shows the upper pole of the kidney at the third lumbar vertebra. The mass is smooth and rather oval, and the shadows of the spleen and of the upper pole of the kidney can be definitely separated from it. There is probably one correction that should be made in the statement about the air injection, that is, the right adrenal is not distinctly seen. There is a round shadow in the region but it does not look like that of the adrenal gland. It does not fit the top of the kidney.

DR. ALFRED O. LUDWIG: How about the degree of decalcification?

DR. HAMPTON: For a woman of that age, I should not get too excited about it. There is a fair amount but nothing unusual.

DR. LUDWIG: The x-ray findings localize the dis-

turbance in the region of the adrenal gland. This patient presented a picture which may have been caused by a number of different conditions. In the first place we have symptoms that appear to have been secondary to the hypertension, with some myocardial involvement and very mild cardiac failure. The electrocardiogram showed evidence of myocardial damage insofar as she had left bundle-branch block.

The most striking symptoms are those referable to the endocrine system. She noticed the appearance of hirsutism, and some difficulty in speech, which is not specified. What was the change in speech?

DR OLIVER COPE: Not much more than language difficulty.

DR LUDWIG: I should have liked to have had you say her speech was hoarse and deep, but that apparently was not the case. This all appeared about eleven years after the menopause in a woman who had had a perfectly normal menstrual history and had borne six children. Physical examination showed a little obesity and general hirsutism, with soft fine hair and marked increase in facial hair, so that she had to shave. There were also acneform lesions of the skin. All these symptoms and signs could occur with an adrenocortical tumor, and it seems to have been localized by x-ray studies, particularly following air injection.

In regard to the laboratory work there was an increase in the red-cell count to 5,500,000, these cases of adrenocortical tumors may show considerable polycythemia. The blood volume was apparently normal, but there have been cases reported in which it was decreased. The sugar tolerance was decreased—a common finding in this type of tumor. The serum calcium and phosphatase were normal, one phosphorus value was on the low side, but she did have values as high as 4 mg per 100 cc, which is normal. The chlorides were normal. There was good renal function as shown by the phenolsulfonephthalein test. The serum sodium was slightly elevated, the cholesterol within normal limits, and the carbon dioxide combining power high.

The main problem in seeing this patient for the first time would be to establish a diagnosis, and the differential diagnosis that I should consider lies between Cushing's syndrome, or pituitary basophilism, and adrenocortical tumor.

Should any other disturbances be considered? One that occurs to me is arrhenoblastoma, an ovarian tumor that is also associated with hirsutism, but with an otherwise different picture, the arrhenoblastoma being a masculinizing tumor.

Hirsutism occurs to be sure, but there may also be loss of hair with baldness, and atrophy of the breasts and genitalia, except for the clitoris and labia majora, which increase in size. Polycythemia is usually present. Acne of the skin is not found, nor are there marked changes in the bones. Usually there is a weight loss rather than obesity, although at times fat deposits may occur. With this type of tumor the diagnosis is usually made by palpation of a pelvic tumor in the region of one ovary, the uninvolved ovary being impalpable. The sugar tolerance may vary, but it is usually not decreased. The blood pressure and basal metabolic rate may also vary, and give no direct clues. The Aschheim-Zondek test is usually negative.

So far as Cushing's syndrome is concerned, I can suggest no method other than perirenal air injection to differentiate clinically between Cushing's syndrome, or basophilic tumor of the pituitary, and adrenocortical tumor. Obesity, hirsutism, decalcification and genital changes with enlargement of the clitoris occur in both. In one case that I looked up, Dr. Cushing stated that increase in the size of the clitoris was not so common in the pituitary as in the adrenal cases, but that does not seem to be generally true as some of the former have been reported with enlargement of the clitoris. In adrenocortical tumors the symptoms that appear depend on the time of life in which the tumor occurs. These are usually tumors of the adrenal cortex, either adenomas or occasionally carcinomas. They may occur in males before puberty, producing the so-called infantile Hercules type with premature growth of hair and enlargement of the genitalia. Male hormones appear in the urine, except in boys under the age of ten, there is rapid growth but later a cartilage loss so that these individuals may be shorter than normal. They tend to be obese. The same syndrome also may occur in young individuals with pineal tumors. In males after the age of puberty adrenal tumors may occur without any symptoms, but endocrine disturbances may begin with polydipsia, hypertrophy of the genitalia or changes in metabolism, usually with increase in secondary sex characteristics tending toward feminism. In females before puberty the cases reported have tended toward pseudohermaphroditism and toward adult masculinity with increased hair growth, increase in the size of the clitoris and labia majora, absence of menstrual periods and change in voice toward the masculine side. Adrenal tumors in females may occur without any endocrine symptoms, and when they do exist they again tend

toward masculinization, with amenorrhea. There may be baldness. The excess hair tends to fall out after the tumor is removed. The genital changes are marked in young patients: the ovaries are small, the clitoris and the labia majora large, the breasts atrophied. Sterility is present, but there are cases in which pregnancy has occurred after the removal of the tumor.

The diagnosis of adrenocortical tumor depends on this technic of air injection which Dr Cope can tell you more about than I. Before that was done the only way to prove the presence or absence of these tumors was by exploration of the adrenal glands. There are a few other points which I cannot discuss adequately, such as the assay of androgenic substances in the urine, which in the presence of some of these tumors increase markedly, although I understand there are some cases in which the androgens are normal. These syndromes may also occur from hyperplasia of the adrenal cortex without the presence of tumor. There are a few other clinical points of differentiation which have been suggested. I do not know how valid they are, but it is said that the pituitary type of hirsutism is lanuginous as contrasted with the ovarian type which is universal and masculine in distribution and the adrenal type which is said to be a growth of coarse dark hair with wide distribution. Pituitary obesity is said to be of the girdle type, ovarian obesity is more general and adrenal obesity tends to involve the face, neck, and body and to be less marked in the extremities. I should like to hear from someone better versed in endocrinology as to the possible significance of hormone tests in the differential diagnosis of these various conditions. I shall make a diagnosis of adrenocortical tumor.

Dr. COPE: It is a difficult case to discuss since the diagnosis is so obvious, but it was not quite so obvious as the record implies. Before the patient came to us she passed through many hands at first she was classed as a cardiac patient and then as someone suffering from general malignancy. One of our former surgical houseofficers first suspected the diagnosis. She shows a combination of the virilism syndrome, if I may call it such, and basophilism. Complete hormonal studies were not done because 17 ketosteroid assays were not available when she was here two years ago. Have not assays been subsequently done on the urine which had been kept?

Dr. ANN T. FORBES: Yes, she had a high titer, 70 mg

Dr. COPE: A titer of 70 mg in twenty-four hours is nearly tenfold more than the average normal woman would show at this age, the upper limit being around 12 to 13 mg.

The surgeon was presented with a problem, and I should like to point out the usefulness of the air injection technic. We did not inject air merely to demonstrate a tumor that was obvious in the plain film. In a person of this age the tumor might well be malignant, and we were therefore interested to know whether the tumor was adherent—the more adherent the less likely we could excise it in toto. After injection you can see the air surrounding the tumor in various views, both on the lateral and anterior plates. The air surrounded the tumor except for one area. We could, therefore, conclude that the tumor was resectable. That is one definite use for air injection.

Dr. Hampton brought out a second point, which is not in the original record. When we did the injection we considered this shadow on the right might be the adrenal gland. None of us would make such a statement now because of the absence of characteristic form—it is fat rather than the adrenal gland. The record from which this abstract was prepared states that there was probably a normal adrenal gland on the right, just below the liver. We were not sure, however, and the right side was explored first, the reason being that excision of an adrenocortical tumor in toto is followed by a very high mortality which in the literature is between 30 and 40 per cent. It is my belief that this mortality is due directly to acute adrenocortical insufficiency. With the excessive secretion from the tumor on one side, the normal adrenal gland on the other side atrophies from disuse, and at the time of operative removal of the tumor, there is insufficient normal adrenal tissue left to continue normal function. So the first thing in this patient was to explore the right adrenal gland.

As the record states, a very small right adrenal gland was found. Three weeks later the large adrenocortical tumor on the left was exposed, and a subtotal excision performed. I did not believe there was enough adrenal cortex on the right side to carry on the normal requirements for cortical hormone, so I left a portion of the tumor behind. Today we should give desoxycorticosterone acetate preoperatively, but this synthetic substance was not available at that time.

Dr. LUDWIG: I should like to ask Dr. Cope to state the difference between pituitary basophilism

and adrenal tumor from the hormonal point of view

DR COPE So far as I know one cannot We have had one patient with an ovarian arrhenoblastoma, for example, who had a normal 17-ketosteroid excretion

DR LUDWIG Most cases of pituitary basophilism have either hyperplasia or adenoma of the adrenal cortex as well

DR COPE At the Peter Bent Brigham Hospital Dr Joseph C Aub has studied a girl who has been completely rid of basophilism following x-ray treatment of the pituitary gland, and I believe there is a primary disease arising in the pituitary gland as well as in the adrenal cortex By the tests that have so far been devised, no method has been found to differentiate physiologically these true cases of pituitary basophilism and those of adrenocortical basophilism The virilism syndrome is also unsettled One of our patients with an arrhenoblastoma showed a normal urinary excretion of 17-ketosteroid for a woman of her age This is an extraordinary observation because she was a masculine type of woman with amenorrhea, after the removal of the tumor the menses returned promptly and she became pregnant Such a woman must obviously have a masculinizing hormone that we do not pick up by the present methods It may not appear in the urine as an ordinary androgenic steroid In the same way we cannot differentiate various types of adrenocortical tumors presenting different clinical pictures—all the way from masculinization to basophilism In other words, although the laboratory has made tremendous advances it is by no means able to tell us in a given patient which gland is diseased

CLINICAL DIAGNOSIS

Adrenal tumor, left (2 type)

DR LUDWIG'S DIAGNOSIS

Tumor of the left adrenal cortex

ANATOMICAL DIAGNOSES

Carcinoma of adrenal cortex, left, with metastases to periaortic nodes

Pulmonary embolism, right

Bronchopneumonia

Cardiac hypertrophy, hypertensive type

Arteriosclerosis, moderate, aortic and coronary

Hirsutism

PATHOLOGICAL DISCUSSION

DR. BENJAMIN CASTLEMAN This tumor weighed about 1000 gm and showed histologically a characteristic adrenal-cell carcinoma Much of the

tumor was necrotic Unfortunately the patient died a few days later from massive pulmonary embolism and bronchopneumonia At autopsy we found in the region of the left adrenal gland a necrotic mass of tissue about 7 by 3 by 2 cm, which microscopically showed necrotic carcinoma The other adrenal gland, although small, appeared normal The regional periaortic lymph nodes were replaced by tumor This is the fourth case of adrenal-cell carcinoma that we have seen here during the past five years One patient had all the symptoms of Cushing's disease, and the negative response to irradiation of the pituitary gland was the only clue to the correct diagnosis¹ The other two cases presented no endocrine changes One was that of a young woman of thirty, who entered because of a mass in the left upper quadrant which was clinically diagnosed as splenomegaly The tumor was removed, and one year later a recurrence in the region of the transverse mesocolon was also removed She gave birth to a baby during the next year, but when last seen, about a year and a half ago, an exploratory laparotomy revealed a huge inoperable recurrence in the left upper quadrant, with metastases to the periaortic lymph nodes The other non-functioning tumor was removed from a forty-three-year-old man who entered the hospital with signs and symptoms of a Brodie's abscess of the tibia, which operation revealed to be a metastatic tumor consistent with one of adrenal origin² The primary adrenal tumor was removed, and a Gritti-Stokes amputation of the leg performed The patient was followed in the Out Patient Department and was doing well until two and a half years after operation, when a large, apparently recurrent, mass was discovered in the left upper quadrant A course of x-ray treatment, totaling 2100 r, was given without any apparent change in the size of the mass When last seen, two months ago, more than three years after operation, the mass was still present, but a chest plate was negative and the patient was feeling quite well

REFERENCES

- 1 Case records of the Massachusetts General Hospital Case 23011 *New Eng J Med* 216 23 27 1937
- 2 *Idem* Case 23121 *New Eng J Med* 216 519 521 1937
- 3 *Idem* Case 24101 *New Eng J Med* 218:438-441 1938

CASE 26262

PRESENTATION OF CASE

A thirty-two-year-old white, African born, WPA worker was admitted to the hospital because he had been "seeing things" for three weeks

The patient was brought to the hospital by his brother and a friend. The history obtained from them was vague and incomplete. It was stated that the patient had been a heavy drinker of alcoholic beverages for many years and had been treated for delirium tremens on two occasions. Three weeks before admission the patient had experienced what appeared to be visual hallucinations, as he saw "cats, dogs, people's faces and so forth. He had been "irrational and out of his head. On occasions he talked normally while immediately thereafter he changed to an entirely unrelatable subject. His irrationality and confusion as well as hallucinations increased for a few days before admission. He was apparently found by the police of an outside community and was taken to the office of a physician, who made a diagnosis of acute alcoholism and stated that the patient had suffered from exposure. He was then referred to this hospital for additional treatment. No further history was obtainable.

On admission the patient was irrational. He was restless, picked at the bed clothes, seemed tense and apprehensive and "jumped at a touch. There was no speech defect, he had visual hallucinations of "cigarettes and "pieces of wood" in his hands, but denied others. He believed that he was in a club and that the date was 1930. He could not give his name, but gave his age and address correctly. He was able to perform simple calculations. His attention was held with difficulty, and recent memory was impaired. The speech was usually irrelevant and partly incoherent. He stated that he fell on the day before admission and struck his head, but gave no other history of trauma. He denied ever having taken drugs.

Physical examination revealed a restless, overactive, jumpy and delirious man. There were fine tremors of both hands, and he continually grasped at imaginary objects. The general examination showed no apparent head or body injuries. The tongue was dry and coated, the throat was red but there were no localized areas of exudation. A postnasal drip was evident over an extremely dry, beefy red pharynx. The upper teeth had been removed, the lower teeth were carious. There was a moderately loud systolic murmur over the apex of the heart. The blood pressure was normal. A few dry crackling rales were heard on deep inspiration at the bases. Examination of the abdomen was negative. The liver was palpable 2.5 cm. below the costal margin in the right midclavicular line, its edge was not tender. A rectal examination was

negative. The genitalia were negative except for the presence of genital warts on the shaft of the penis. There were abrasions over the elbows and scars over the lower legs, but otherwise the extremities were normal. Both pupils were dilated and fixed to light, the left was slightly larger than the right (the patient had received "drops" from a physician the day before, for examination of the evertgrounds). The remainder of the cranial nerves were normal. Both calf muscles were tender bilaterally. Sensation was normal. The abdominal, Hoffmann and cremasteric reflexes were absent. The knee jerk on the right was slightly more acute than that on the left. The plantar reflexes were down. The Gordon and Oppenheim tests were negative. Cerebellar functions could not be tested. The neck was stiff, and there were bilateral Kernig signs.

The temperature was 100.2°F., the pulse 120 and the respirations 26.

Examination of the blood showed a red-cell count of 4,500,000 with 80 per cent hemoglobin (Tallqvist), and a white-cell count of 12,500 with 94 per cent polymorphonuclears; the smear was normal. The urine examination was negative save for the presence of a ++ albumin test. The blood Hinton test was positive, the blood Wassermann test weakly positive. The serum protein was 5.3 gm. per 100 cc., the serum nonprotein nitrogen 11 mg. The blood serum bromide examination was negative. A lumbar puncture showed an initial pressure equivalent to 200 mm. of water, with moderate cardiac and respiratory excursions. About 5 cc. of xanthochromic fluid was removed, with a final pressure of 105 mm. A cell count showed 300 lymphocytes, 100 red blood cells (crenated) and 15 polymorphonuclear cells per cubic millimeter. The Pandy test was ++, the total protein was 618 mg. per 100 cc., the gold sol test was 0001223321, the spinal-fluid Wassermann test was negative. The spinal-fluid sugar after another lumbar puncture was 36 mg. per 100 cc.

Röntgenograms of the chest showed no definite evidence of disease, although the skull showed a very questionable fracture line in the posterior parietal region. The findings, however, were said to have been not sufficient for diagnosis.

The patient remained in the hospital some fifty odd hours, during which time he ran a continuous temperature above 102°F. He remained partly disoriented and required active sedation and restraint. He was given large doses of nicotine acid and thiamin chloride, and fluids were

forced In spite of all efforts of therapy, however, the patient expired early on the morning of the third hospital day It was stated that his respirations suddenly became "rapid," and by the time a physician had arrived he was dead

DIFFERENTIAL DIAGNOSIS

DR MERRILL MOORE* I do not need to tell you that this is a difficult case We might attempt in a logical way to rule out some of the more obvious possibilities We know that this man was alcoholic That is definitely stated by the informant and is probably the most obvious fact with which we have to deal, and it would be convenient if we could relate his final illness to his alcoholism When we consider the causes of death in chronic alcoholism we recall that patients do die with no more specific diagnosis than delirium tremens, although there we are not very sure of the exact way in which death occurs—possibly with a general disturbance of body metabolism and disturbances in the cerebral circulation We also find such patients dying of what is now beginning to be diagnosed clinically as Wernicke's disease, and there too the exact cause of death is not clear, although at autopsy the findings are usually more definite and more demonstrable than they are in delirium tremens And we also know that alcoholism is a "smoke screen," that excessive drinking is often the result of psychological or social disturbances and that excessive drinking can and often does mask organic disorders of a serious nature, for the chronic alcoholic patient is very difficult to examine He is usually unco-operative, he is often beclouded mentally, and unless one is accustomed to examine them, alcoholism can often mask neurological disturbances The examination of the eyes is often difficult, and so are tests for muscle tone We must remember that sometimes there can be absolutely no dependence on the examination, and that it is always possible for the examination to be inadequate Therefore, before assuming that this patient died either of delirium tremens or of Wernicke's disease, we have to consider very carefully the very definite changes in the spinal fluid that are not entirely compatible with either diagnosis, accordingly, I should like to begin an attempt at a differential diagnosis in this case by saying that it does not seem to me that this patient died of delirium tremens or of Wernicke's disease

The second point we must keep in mind in attempting to approach a diagnosis is that this patient does give a history of a fall How reliable it is

we do not know, but it is a part of the history that we cannot ignore, and I think we should not exclude it as a possible factor in his illness We have to consider subdural or possibly intracerebral hemorrhage, and although the x-ray plate alone is not sufficient for diagnosis, it does bring up the question of a linear fracture We know that alcoholic patients are very prone to have subdural hemorrhage, but if we assume that this patient did have one, we have to admit that the spinal-fluid findings in this case are unusual for such a diagnosis, although the pressure is rather high and there is an excess of white blood cells in the spinal fluid In uncomplicated cases of subdural hemorrhage, we do not ordinarily see this except in conjunction with other or concomitant intracerebral hemorrhage due to trauma If we try to tie up the whole history with the patient's alcoholism, we should think of subdural or intracerebral hemorrhage as a result of a fall the patient may have had while intoxicated, and consider that as one possible cause of death But furthermore we have to consider the possibility as to whether this patient's terminal illness bore no relation at all to alcoholism, which is also quite possible If this were so, what could the other disturbance be?

There is much in his illness to suggest that the terminal illness was not related to alcoholism and that he might have died, and probably did die, of some more or less acute febrile illness If we are to admit that possibility, in spite of the weakly positive blood Wassermann test, the positive blood Hinton test and the negative spinal-fluid Wassermann test, we have to consider, first, tuberculous meningitis, since the spinal fluid contained 300 lymphocytes, 15 polymorphonuclear cells, a total protein of 618 mg and a sugar of 36 mg At that point we must remember that it is unfortunate that we do not have more spinal-fluid examinations because they would be extremely helpful in differentiating the various types of meningeal reaction that this patient may have undergone They would be a great deal of help in making an accurate differential diagnosis

Other possibilities could be an intracerebral hemorrhage, not related to trauma, which might have been located near one of the ventricles and which might thereby have caused softening of the ventricular wall and might have given rise to a meningeal cellular reaction in the spinal fluid This could explain the high cell count and the high protein This lesion might have occurred in one of the silent areas, in the frontal area or even in the basal cerebellar region I do not believe that I can make any more definite diagnosis of this

*Associate in psychiatry Harvard Medical School

case without an autopsy. It is possible that one might be made if more careful and repeated clinical examinations had been possible and if more spinal fluid examinations had been made. I can say very definitely that I do not believe that this man died of alcoholism alone and that there was some complicating factor in the nervous system, which might have been a subdural or intracerebral hemorrhage from trauma, an intracerebral hemorrhage without trauma or, more probably, an acute meningeal reaction of the tuberculous type. The negative spinal-fluid Wassermann is strongly indicative that it was not an acute syphilitic meningitis. The only recent case of subdural hemorrhage in an alcoholic patient that we have seen had spinal fluid findings similar to those in this case but also had an intracerebral hemorrhage near a ventricle. We should not close the discussion of this case without mention of the remote possibility of brain abscess or new growth although the history is rather acute in its onset for such a diagnosis and no focal area is suggested by the patient's history or examination.

DR. RICHARD SCHATZKI: There are two lateral portable films of the skull apparently taken a few hours before he succumbed, when he was in a very unco-operative state. There is no reason to suppose they would show anything but the gross pathology. A question might be raised as to whether it is justifiable to subject a patient to examination of the skull when so little is to be expected, the procedure is at times not without danger to the patient.

DR. MOORE: Was another Wassermann test done?

DR. MALLORY: Not on the spinal fluid. The blood Hinton was checked.

DR. JAMES B. AYER: I do not remember this case. I think Dr. Moore is on safe grounds when he says there is something besides alcoholism

As I read the case it seemed to me there must have been hemorrhage, and I should rather like to place it at the base, probably a meningeal hemorrhage at the base. With fractures at the base of the skull we see that fatal type of hemorrhage which may seep into the basal cisternae, may give a high spinal fluid protein and a rhinorrhea and does not show by x-ray except rarely. With the high protein and the increased cells, I also wonder if infection from the nasopharynx has not occurred.

DR. MOORE: You interpret the postnasal drip as the result of a basal fracture?

DR. AYER: It could be.

DR. MOORE: Yes, it could be.

CLINICAL DIAGNOSES

Delirium tremens

Meningitis?

Intracranial hemorrhage?

DR. MOORE'S DIAGNOSIS

Tuberculous meningitis.

ANATOMICAL DIAGNOSIS

Tuberculous meningitis

Miliary tuberculosis

PATHOLOGICAL DISCUSSION

DR. MALLORY: There was no fracture of the skull, and no hemorrhage was found. The meninges at the base were quite cloudy, and there were some suggestive tubercles on gross examination. On microscopic examination there was quite clearly a tuberculous meningitis. Miliary tubercles were found in considerable numbers throughout the viscera, and the meningitis was unquestionably secondary to a generalized miliary tuberculosis.

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CONGRATULATIONS

THE *Journal* extends congratulations to Dr. Frank Howard Lahey, of Boston, because of his designation as president-elect of the American Medical Association, and to the House of Delegates because of the wisdom of its choice.

The American Medical Association was organized in 1847, and during the first fifty years, six New England physicians—four from Massachusetts and two from Connecticut—served as presidents. Of the former, the first was John Collins Warren, of Boston, who was elected in 1849. David Humphrey Storer, of Boston, was chosen in 1866, Henry Ingersoll Bowditch, of Boston, in 1877, and Henry Orlando Marcy, of Cambridge, in 1892. To serve during the next forty-five years, only one New England representative was selected,

—Herbert Leslie Burrell, of Boston,—and he held office in 1908, thirty-two years ago.

In view of the prominence of Boston as a medical center, in view of the responsible positions held by its physicians in the various societies devoted to medicine, surgery and the medical specialties and in view of the many excellent physicians scattered throughout New England, it has been difficult to understand why only one physician from this section of the country had been elected to the presidency of the American Medical Association in forty-eight years. Perhaps Yankees, in general, are uncompanionable, and perhaps Bostonians, in particular, are a bit complacent. So far as Dr. Lahey is concerned, his innumerable friends all over the United States refute the former, and the views expressed in his published papers and unpublished speeches negate the latter. This acquaintance and this broadmindedness, together with his well-recognized ability as a surgeon, as an administrator and as a teacher of physicians, make the choice of the House of Delegates a happy one.

PROLONGED RESIDENCIES THEIR EFFECT ON THE PRACTICE OF MEDICINE

THE effect of prolonged residencies on medical education and on hospitals has been considered in the June 13 and June 20 issues of the *Journal*. The third and final problem—that of their effect on the practice of medicine—presents obvious difficulties, such an effect or effects will not be experienced immediately, and it is hazardous in the extreme to attempt to predict them. The effort is not without interest, however, and some of the premises, at any rate, may be agreed on regardless of whether or not the conclusions seem acceptable.

The product of the new system will certainly be a much more highly trained man than the majority of his predecessors. He will have had an intensive clinical experience with hospital medicine but not the slightest experience with practice. Five years of semi-monastic institutional life with consultants, nurses, laboratories, dietitians and social service workers at his beck and call are hardly the best of backgrounds for adaptation to an individ-

ualistic, competitive medical practice. Having passed the age of thirty, he finds himself cast loose into the community without a contact that might reasonably bring a patient to his office. His erst while classmate in college, who sensibly decided to sell bonds, is seriously concerned about the preparatory school to which the son should be sent. It is only reasonable to suppose that any offer of immediate financial security will prove almost irresistible to him, and that the numbers of full-time salaried specialists—and by the newer definitions this will certainly mean surgeons and probably internists—will be increased by his accession. Accustomed for so many years to constant consultative association with other specialists, he will also start with a strong tendency toward group medicine rather than toward individual practice.

In line with this, and as another by-product of the new system, and of the boards of certification, which have done so much to bring it into effect, there will be an increased sharpness in the division between practitioner and specialist. As adequately trained men become more numerous and as the criteria of such training become recognized more generally it will be increasingly difficult for men to shift from the first status to the second. To a large extent this will be a safeguard to the members of the community, who will thus be protected from untrained, self-styled "specialists." There are potential liabilities, however. Even an inadequate surgeon or roentgenologist is far better in an emergency than no surgeon or roentgenologist at all. It is to be hoped that requirements and regulations preceding certification will not be pushed to such an extreme that small communities which cannot support a variety of fully qualified specialists will be deprived of essential services.

Furthermore, it is most important that the specifications of training shall not become too rigid. There is gentle irony in the fact that men who to a large extent were self-taught believe that their successors cannot achieve an education in the same manner. Instruction is a short cut to knowledge properly imparted and assimilated it will greatly accelerate the acquisition of knowledge and will prevent many a needless mistake, but all the in-

struction in the world will never eliminate the need for self-education. It is fair enough to demand proof of qualification, but the gateway must never be closed to the man who chooses the unconventional and original approach. By present standards Harvey Cushing's training in brain surgery was shockingly inadequate!

MEDICAL EPONYM

CHADWICK'S SIGN

James R. Chadwick (1844-1905), of Boston, made no claim to be the discoverer of the diagnostic value of the bluish discoloration of the vaginal mucous membrane which occurs in pregnancy, but in an article appearing in the *Transactions of the American Gynecological Society* (11:399-415 1887), entitled "The Value of the Bluish Coloration of the Vaginal Entrance as a Sign of Pregnancy," after referring to previous observers of the phenomenon, he states:

In scrutinizing the color of this part in a large number of women I early discovered that while in the majority the bluish tinge appeared over the whole vaginal entrance, there was a fair proportion in which the violet tint was confined to the anterior wall of the vagina, just below the urinary meatus, whence it shaded off into the normal pink color laterally. This, when distinctly perceptible I soon found to be, in my practice, an absolutely sure sign of pregnancy. There were, furthermore, a very few in whom the blue tint was universal but more accentuated on the posterior wall of the vaginal entrance, which I found was valueless as a sign of pregnancy unless the color was quite deep. The recognition of this peculiar localization of the blue tint on the anterior wall as a sure sign of pregnancy I feel is the most important new point in this communication.

R.W.B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

RAYMOND S. TITUS, M.D., Secretary
330 Dartmouth Street
Boston

PYELITIS OF PREGNANCY

Beginning with the May 2, 1940, issue pyelitis of pregnancy has been discussed in the *Journal*. The cases of former years emphasized symptomatic treatment: rest in bed, urinary antiseptics

A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

and forced feedings. The prognosis of the immediate attack was always good. The disease might well recur during pregnancy, but the opinion was held that after delivery the kidney infection spontaneously cleared up with no subsequent damage. We know that this is not always the case—that pyelitis of pregnancy is very frequently followed by permanent kidney damage. As cystoscopy and kidney lavage became common practices in urology, their use in diagnosing and treating renal disease during pregnancy naturally followed. Cases have been presented showing distinct improvement following this form of treatment, the acute attacks subsided much more quickly than they did under symptomatic treatment, and subsequent exacerbations were not so common.

The present era of chemotherapy includes the field of kidney infection. Mild cases have responded remarkably well to this type of therapy, and such results may lead the medical profession to disregard the value of intravenous pyelograms, cystoscopy and kidney lavage, occasionally to the detriment of the individual patient. All cases of pyelitis of pregnancy which do not respond to supportive treatment should be seen by competent urologists before chemotherapy is instituted. Sulfanilamide and its allied compounds are not fool-proof drugs, and their administration should never be undertaken by one who is not versed in their use. The patient's health will best be served by an appreciation of this fact by general practitioners and by obstetricians.

In the series presented no cases have been reported in which there was the need for interrupting pregnancy because of pyelitis, however, twenty or twenty-five years ago this was not uncommon. Early diagnosis, early consultation, kidney lavage, if necessary, and chemotherapy should make this procedure entirely unnecessary except in cases already presenting irreparable kidney damage. It is also possible that chemotherapy may reduce very materially the permanent kidney damage that we now know so frequently followed attacks of pyelitis during pregnancy.

The subsequent series of cases will deal with pneumonia as a complication of pregnancy.

DEATHS

HAYES—**WILLIAM F. HAYES, M.D.**, of Beverly, died April 4. He was in his fifty-ninth year.

Dr. Hayes received his degree from Tufts College Medical School in 1909 and was a member of the Massachusetts Medical Society and the American Medical Association.

PEASE—**EDWARD A. PEASE, M.D.**, of Pasadena, California, died June 19. He was in his seventy-sixth year.

Dr. Pease received his degree from Harvard Medical School in 1892 and was a fellow of the Massachusetts Medical Society and the American Medical Association.

RUGGLES—**EDWIN P. RUGGLES, M.D.**, of Dorchester, died June 19. He was in his sixty-eighth year.

Born in Milton, he received his education at Springfield College and the University of Iowa, and obtained his degree from Boston University School of Medicine in 1900. He was director of physical education at the University of Iowa for two years, and in 1903 became a member of the staff of the Massachusetts Memorial Hospitals.

Dr. Ruggles was professor emeritus of obstetrics at Boston University School of Medicine and had served as chief of the obstetric service at the Massachusetts Memorial Hospitals.

Among his affiliations were fellowships in the Massachusetts Medical Society and the American Medical Association, and memberships in the New England Obstetrical and Gynecological Society and the American College of Surgeons.

His widow and a daughter survive him.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MAY, 1940

| DISEASES | MAY 1940 | MAY 1939 | FIVE YEAR AVERAGE* |
|--------------------------|----------|----------|--------------------|
| Anterior poliomyelitis | 1 | 0 | 4 |
| Chicken pox | 1207 | 742 | 1091 |
| Diphtheria | 15 | 21 | 22 |
| Dog bite | 1422 | 1414 | 1259 |
| Dysentery bacillary | 15 | 5 | 6 |
| German measles | 109 | 91 | 2251 |
| Gonorrhea | 313 | 358 | 435 |
| Lobar pneumonia | 386 | 355 | 423 |
| Measles | 4060 | 4917 | 3415 |
| Meningococcus meningitis | 3 | 6 | 16 |
| Mumps | 943 | 679 | 993 |
| Paratyphoid B fever | 22 | 0 | 20 |
| Scarlet fever | 672 | 731 | 1027 |
| Syphilis | 518 | 462 | 470 |
| Tuberculosis pulmonary | 395 | 239 | 271 |
| Tuberculosis other forms | 31 | 30 | 29 |
| Typhoid fever | 17 | 2 | 6 |
| Undulant fever | 8 | 4 | 3 |
| Whooping cough | 756 | 635 | 634 |

*Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Chicopee, 1, total, 1.

Diphtheria was reported from Boston, 2, Fall River, 3, Framingham, 1, Methuen, 2, North Andover, 1, Worcester, 6, total, 15.

Dysentery, bacillary, was reported from Attleboro, 3, Boston, 4, Deerfield, 1, Lowell, 6, Milton, 1, total, 15.

Infectious encephalitis was reported from Beverly, 1, Danvers, 1, total, 2.

Meningococcus meningitis was reported from Beverly, 1, Lynn, 1, Reading, 1, total, 3.

Paratyphoid B fever was reported from Arlington, 1, Bernardston, 1, Boston, 6, Concord, 1, Haverhill, 2, Lynn, 1, Medford, 2, Newton, 3, Pittsfield, 3, Quincy, 1, Worcester, 1, total, 22.

Pfeiffer bacillus meningitis was reported from Attleboro, 1, New Bedford, 2, total, 3.

Septic sore throat was reported from Amesbury, 1, Arlington, 1, Belmont, 1, Boston, 5, Fitchburg, 1, Foxboro, 1, Gardner, 1, Greenfield, 1, Leominster, 1, Lynn, 2,

Milford, 1 Quincy, 2 Weymouth, 1, Winchester 2 Wrentham, 1 total, 22.

Tetanus was reported from Saugus, 1 Wareham 1 total, 2.

Trachoma was reported from Everett, 1 Wakefield 1 total, 2.

Trichinosis was reported from Greenfield, 2 Hadley 1 North Andover 2 total 5

Typhoid fever was reported from Arlington 1 Middleboro, 1 New Bedford 1 North Attleboro 1 Norton, 4 Provincetown, 1 Somerville 6 South Hadley 1 Taunton 1 total 17

Undulant fever was reported from Adams, 1 Danvers 1 Middleboro, 1 Milton 1 Southbridge, 1 Swampscott, 1 West Boylston, 2 total 8.

Typhoid fever had its highest May incidence since 1931. A recent outbreak in the Metropolitan area is responsible for the greater part of this sudden increase.

The May incidence of undulant fever is higher than it has been since 1930. The reported cases are scattered throughout the State.

A recent outbreak of paratyphoid B fever in the Metropolitan area accounts for a sudden sharp rise in the reported incidence of this disease.

The reported incidence of dog bite is reaching its seasonal peak.

The incidences of chicken pox and measles are reported at levels slightly above the five-year average.

Anterior poliomyelitis and German measles are reported well below the five year average.

Gonorrhea, lobar pneumonia, meningococcus meningitis, mumps, bacillary dysentery scarlet fever and tuberculosis are reported at expected levels.

HARVARD MEDICAL SCHOOL

Selection of the three outstanding candidates for admission to the Harvard Medical School next fall as recipients of national scholarships offered by the school under Harvard University's "long-term" scholarship policy was recently announced. The winners are James S. Clarke, of La Grange, Illinois, A.B. Harvard 40 (Daniel Fiske Jones National Scholarship) Martin E. Flipse, of Douglaston Long Island, New York, A.B. Hope College 40 (Edward S. Harkness National Scholarship) and Winsor C. Schmidt, of Rye, New York, Sheffield Scientific School Yale (Harvard Medical School National Scholarship).

This is the fourth year of the medical school's national scholarship plan which is similar to that introduced by President James B. Conant in Harvard College in 1934 and subsequently adopted also by the Graduate School of Arts and Sciences, the Graduate School of Design and the Graduate School of Business Administration.

In addition medical-school scholarships totaling \$1300, for study during the next academic year were awarded as follows: Matthew and Mary E. Bartlett Scholarship to James P. Dixon, Jr., of Yellow Springs, Ohio S.B. Antioch 39; Abraham A. Watson Scholarship to Lytt I. Gardner of Reidsville, North Carolina A.M. University of North Carolina 40 and Isaac Sweetzer Scholarship to Frank E. Trobaugh Jr., of West Frankfort Illinois A.B. University of Illinois 40.

TUFTS COLLEGE MEDICAL SCHOOL

Ninety-seven students of the Tufts College Medical School received medical degrees at the college's eighty-fourth commencement exercises on Monday June 17.

The Annual Alumni Award a sphygmomanometer of special construction given to the graduate who is considered to have made the most progress in the four year course at the medical school was won by John D. Rice, of Worcester who received his premedical training at Bowdoin College. The Phi Delta Epsilon Gold Medal, for proficiency in the study of anatomy was given to Fred W. Thyng of Shapleigh Maine, who also received his premedical training at Bowdoin College. The name of the winner of the latter is inscribed each year on a bronze tablet in the medical school. Dr. Thyng received his degree cum laude. Others who received their degrees cum laude were Edward N. Cartmick, A.B. Harvard, of Clifton New Jersey Robert A. Hays A.B. Boston College, of Waltham Harvey W. Katz, B.S. Tufts College of Everett Leonard M. Klein A.B. Harvard of Roxbury Emil J. Koenig Jr., B.S. Massachusetts State College, of Jefferson Abraham Pollen B.S. Tufts College, Chelsea Stanley L. R. Robbins, B.S. Massachusetts Institute of Technology of Brookline Gertrude A. Rogers, A.B. Radcliffe, of Dorchester.

MIDDLESEX UNIVERSITY SCHOOL OF MEDICINE

The trustees of Middlesex University announce the appointment of Dr. Augustus Riley of Boston as dean of the medical school. Dr. Riley was born in Alabama in 1879 received his baccalaureate degree in arts from Oberlin College, and his medical degree from Harvard in 1907. After graduation he served an internship at the Long Island Hospital Boston, and a surgical internship at the Massachusetts General Hospital. He is a member of the American Urological Association and a fellow of the American College of Surgeons. He is assistant professor of genitourinary surgery at the Harvard Medical School where he has taught since 1911 and is visiting surgeon for urology at the Boston City Hospital. Dr. Riley will take office immediately.

MASSACHUSETTS SOCIETY FOR RESEARCH IN PSYCHIATRY

On May 2 1940 the Massachusetts Society for Research in Psychiatry was officially organized and held its first meeting.

The object of the society is to stimulate research in psychiatric medicine and its allied sciences in the psychiatric institutions of the Commonwealth. Members are made up of active and associate members, the active membership being limited to those who have completed or presented before a recognized scientific society or published in a recognized scientific journal results of research work which they have done within the last five years. This active membership will cease after more than three years have elapsed without production of original work, the member becoming an associate member. The associate members are selected from those having a background and training that renders them suitably qualified to become research workers, and from those who are participating in research work.

The meetings are to be held six times a year at the various hospitals in the Commonwealth engaged in neuropsychiatric work. They are to be devoted to symposiums and to informal discussions of projects, methods, techniques and demonstrations of research work actively engaged in or under discussion.

The following officers were elected for the coming year: president, Dr. William Malamud, vice-president, Dr. Paul Yakovlev, secretary-treasurer, Dr. Kenneth J. Tillotson.

CORRESPONDENCE

MILITARY PREPAREDNESS PROGRAM

To qualified physicians of Massachusetts the National Guard (26th Division) offers an opportunity to participate in the military preparedness program.

The 101st Medical Regiment and the medical detachments of the various combat units of the 26th Division are in the process of being expanded so that the advantage of early consideration of military service is obvious, both from the standpoint of choice of service and that of seniority.

All who are interested are urged to contact one of the officers of the Division Surgeon's Office, who will gladly discuss the various units and furnish information regarding qualifications, duties, pay and allowances. This office is located in the South Armory, Irvington Street, Boston, and is open Tuesday and Friday evenings from eight until ten o'clock.

Act now! The National Guard needs qualified physicians, and the latter need the practical experience which only service with troops can afford.

KARL R. BAILEY,
Colonel, M. C., Mass. N. G.,
Division Surgeon

REPORTS OF MEETINGS

GREATER BOSTON MEDICAL SOCIETY

A regular meeting of the Greater Boston Medical Society was held at the Beth Israel Hospital on March 5, with Dr. Max Ritvo presiding.

Dr. William B. Castle spoke on "Blood Dyscrasias: An aspect of general medicine." The importance of a complete history and accurate physical examination as well as blood studies in these conditions was stressed by Dr. Castle. The limitations of bone marrow biopsy in the diagnosis of anemias were contrasted with the greater definitiveness of lymph-node biopsy in differentiating the lymphoma group.

The blood dyscrasias were divided into groups depending on what can be expected from their treatment. Among preventable diseases Dr. Castle listed the hypochromic anemia of pregnancy and that associated with rapid growth in childhood, aplastic anemia and atypical leukemia due to industrial exposure to the cyclic compounds, and hemorrhagic disease of the newborn. Those in which cure or great benefit may be expected from proper therapy included congenital hemolytic jaundice, pernicious anemia without neurologic manifestations, "idiopathic" hypochromic anemia and hemorrhagic disease of the newborn. The third group consisted of conditions where treatment is of some help, such as polycythemia vera, chronic leukemia, idiopathic thrombopenic purpura, lymphoma, pernicious anemia with combined system disease, and malignancy complicated by treatable anemia.

The value of vitamin K in preventing as well as treating hemorrhagic disease of the newborn was emphasized. So-called idiopathic hypochromic anemia was attributed in most cases to apparent or occult blood loss and so should be attacked by discovering and stopping this loss and giving adequate iron therapy. Dr. Castle spoke of bleeding, with or without a low-iron diet, in order to pro-

duce the iron lack necessary to control the overactive blood production of polycythemia vera. The value of x-ray therapy in chronic lymphatic leukemia and the lymphomas was considered to lie in the increased duration of effective and comfortable life rather than in any prolongation thereof, except when local expanding lesions threaten vital structures. The neurologic manifestations of primary anemia can at least be arrested with adequate liver therapy. Finally, many patients with malignant disease can be made much more comfortable by caring for coincidental anemia.

Among the conditions which may be improperly diagnosed in the presence of blood dyscrasias, Dr. Castle cited heart disease, gastrointestinal disturbances, nephritis, neurologic lesions and liver disease. Unnecessary disability or dangerous procedures might result from false diagnosis. The speaker warned against splenectomy unless congenital hemolytic jaundice or idiopathic thrombopenic purpura has been surely diagnosed, against roentgen therapy in the possible presence of aplastic anemia or non-leukemic myelosis and against ill-advised surgery in untreated scurvy, hemophilia or vitamin K deficiency. A mistaken diagnosis may lead to an erroneous prognosis. Thus a patient given a hopeless prognosis from supposed leukemia may live indefinitely to taunt the doctor after recovery from his infectious mononucleosis. The converse may also occur. Proof of poor diagnosis was illustrated by statistics on pernicious anemia, where in a series of 100 patients the average delay from the onset of definite symptoms to the making of the correct diagnosis was almost a year and a half. In those whose original symptoms were alimentary, the diagnosis was not made on the average for almost three years.

The anemias were divided into two large groups, those in which the demand for red cells exceeds the supply and where the bone marrow is physiologically active, and those in which the supply is deficient for even a normal demand and the marrow activity is depressed. The first group includes the two large subgroups of acute blood loss and increased blood destruction. The latter subdivision is made up of extrinsic causes such as chemicals and infections, and intrinsic ones such as abnormal erythrocytes or abnormal plasma. The large division exhibiting poor hematopoiesis includes nutritional, hormonal, toxic (benzene), physical (x-ray), mechanical (malignancy) and idiopathic causes. In those anemias caused by encroachment of malignant tissue on the marrow there is a false activity mirrored in the peripheral blood as a result of overworking of the reduced amount of effective hematopoietic tissue.

Dr. Castle went on to discuss criteria for the diagnosis of certain of the blood dyscrasias, emphasizing the importance of at least a hemoglobin determination and a blood film in every patient. These will prevent gross oversight and will serve to indicate the need for more extensive blood studies. Hypochromic anemia can be diagnosed by blood examination alone, for the only possible similarity appears in chronic infection. Congenital hemolytic jaundice is characterized by a significant increase of the erythrocyte fragility due to the predominance of spherocytes. In most instances, however, the diagnosis cannot be made without, in addition, a careful history and physical examination. In pernicious anemia, these were considered particularly important, for the symptoms may follow the characteristic symptom pattern of stomatitis and neural manifestations. It was pointed out that such symptoms may occur with only minimal anemia.

Dr. Castle briefly discussed the two theories as to the pathogenesis of pernicious anemia. One holds that the liver extract necessary for erythrocyte maturation is formed

by the action of the gastric secretions on some food substance, probably a portion of the vitamin B complex. Rhoads, on the other hand, believes there is a toxin which causes hemolysis only in the presence of malnutrition. In describing the current method of treating pernicious anemia, Dr Castle emphasized that the U.S.P. unit of liver extract used is based on a satisfactory hematopoietic response and does not necessarily indicate the therapeutic effectiveness on gastrointestinal or central nervous system manifestations of the disease. The speaker advocated the use of 5 to 10 U.S.P. units intramuscularly on each of the first two or three days, and a minimal maintenance dose of 15 units intramuscularly each week for about three months, at which time it may be halved if the clinical and hematological condition is satisfactory. The oral administration of liver extract was considered undesirable, especially in patients with severe anemia or combined system disease, because of the possible failure of a certain proportion of patients to respond.

Dr Castle then considered the hypochromic anemia of iron deficiency which is found especially during the period of rapid growth at puberty in pregnancy and in bleeding of all sorts. The considerable loss of iron during the menstrual cycle of women was stressed as an important cause of so-called "idiopathic" hypochromic anemia. Studies of the effect of maternal anemia on the infant showed that there is no relation to the infant's level at birth, but that children of anemic mothers are prone to the development of anemia at about one year. The indiscriminate use of expensive liver extract in undiagnosed anemias was deprecated because of the possibility of confusion as to what brought about recovery and also because it might commit the patient to an unnecessary life of continuous liver therapy.

There was a brief consideration of the significance of certain findings on blood examination. Leukopenia might be found in influenza, measles, typhoid fever, undulant fever, malaria, catarrhal jaundice, the Felty syndrome, agranulocytosis, aleukemic leukemia, Banti's syndrome, aplastic anemia, pernicious anemia and cirrhosis of the liver. It was emphasized that in agranulocytosis there is usually little evidence of depression of the red blood cells and platelets, which are, however, affected in aplastic anemia and aleukemic leukemia.

Among common conditions causing lymphocytosis were cited pertussis, measles, rickets, tuberculosis, infectious mononucleosis and the lymphatic leukemias. The latter two diseases were particularly stressed, and the diagnostic value of the heterophile agglutination test in mononucleosis was emphasized. The complexities of the clinical manifestations and terminology of the leukemias and lymphomas were explained by an analogy to the different manifestations of staphylococcal infections: furuncle, osteomyelitis, septicemia.

Dr Castle concluded with a brief résumé of hemorrhagic disease. This was divided into vascular platelet and coagulation defects. Conditions of the first group were infections, arteriosclerosis, congenital thrombasthenia, nutritional deficiencies (vitamin C) and allergic diseases, such as Henoch's purpura. Thrombopenic purpura was subdivided into symptomatic, which may occur in aplastic or myelophthisic anemia or leukemia, and "essential" which includes allergy to drugs and the idiopathic form. In the latter there is usually no decrease of leukocytes and erythrocytes, the bleeding time is prolonged, the clotting time normal and the tourniquet test positive, whereas the platelets are reduced. Splenectomy is the only but not a regularly effective treatment for idiopathic thrombopenic purpura.

The discussion was opened by Dr M. B. Strauss, who stated that more than 12 patients have been seen at the Boston City Hospital in the past two years who were unnecessarily under liver therapy for a mistaken diagnosis of pernicious anemia. It was claimed that repeated doses of liver extract intramuscularly at intervals of not more than four weeks are preferable to single large doses at less frequent intervals.

Dr Henry Jackson Jr. reiterated the importance of studying the patient as a whole rather than merely the blood. He stated that a definite sequence of events occurs in bone marrow failure and may account for the variable peripheral blood picture during the course of a disease. Anemia can take place only with time, thus it is gradual in such conditions as leukemia. Dr Jackson cited the importance of distinguishing myeloid metaplasia from chronic myelogenous leukemia and hemolytic jaundice, either of which it may simulate. X-ray therapy in the first instance or splenectomy in the second would undoubtedly prove fatal if the wrong diagnosis were made.

Dr B. M. Jacobson advocated the routine use of Hayem's rather than Gower's solution for red-blood-cell counts for in this way one may note a precipitation of the mercury bichloride in the presence of an elevated serum globulin, such as is found in liver disease and multiple myeloma. He reminded the audience that although nutritional anemias are decreasing, the advent of new drugs has offset this improvement by producing other kinds of anemia.

Dr Wyman Richardson discussed "splenic anemia" a term loosely used in anemias associated with splenomegaly. Splenomegaly is known to have some relation to leukopenia but Dr Richardson doubts that the same can be said for anemia. He believes that there is always hemorrhage to account for hypochromic anemia and that thrombosis of the splenic vein may cause this. Splenectomy was not advocated.

Dr William Dameshek emphasized the importance of interpreting blood findings on a physiological basis. He mentioned the rare cases of hemolytic anemia with jaundice but no bilirubinuria which may be benefited by splenectomy. Dr Dameshek stated that splenectomy does affect the bone marrow in purpura, for there seem to be abundant megakaryocytes but no platelet formation.

BOSTON ORTHOPEDIC CLUB

A regular meeting of the Boston Orthopedic Club was held at the Boston Medical Library on March 11 with Dr Armin Klein presiding.

The speaker of the evening was Dr Warfield M. Frior who spoke on "Recent Experimental and Clinical Observations on Tetanus." The first part of the discussion was devoted to recent experiments performed at the Johns Hopkins University School of Medicine in an attempt to disprove the neural transmission of tetanus toxin and to determine the true mechanism of the pathogenesis of the resultant disease.

The original work was initiated by Abel who by careful technique showed that local tetanus does not result from sciatic injection of the toxin and that antitoxin injected into the nerve proximal to the toxin does not prevent local tetanus unless it is allowed to leak out into the surrounding tissues. It is believed that the fallacy of Meyer's experiments, which seemed to indicate that tetanus toxin is transmitted by peripheral nerves, consisted in allowing leakage from the nerve. Abel was also able to perfect a method for producing local tetanus which lasted for three months before the muscle returned to normal. Multiple intramuscular injections totaling only one two-hundredths

of a lethal dose of the toxin resulted in an unyielding rigidity that was considered a true peripheral manifestation of the disease, the site of action being the neuromuscular end-organs

In order to prove that both rigidity and convulsive spasms result from the action of tetanus toxin on the anterior horn cells of the cord, Meyer injected toxin directly into the spinal cord. He obtained an extremely painful form of the disease which he called tetanus dolorosus. In repeating these experiments Dr. Firor was able to avoid this painful complication by rotating the cord before injecting the toxin into the anterior horns. These injections produced tactile reflex tetanus without inducing any muscular rigidity. With tactile reflex tetanus the slightest sensory stimulus initiates a series of clonic spasms that last for two or three minutes.

Although this seemed to be a central form of the disease without true peripheral manifestations, the puzzling fact was that the animals all died, even when only a small fraction of an ordinary lethal dose was employed. Various hypotheses were suggested to account for this lethal phenomenon. That a metabolic poison from the convulsions was not responsible was proved by separating the cauda equina from the spinal cord and then injecting the stump so that peripheral contractions did not occur, and yet death occurred. To disprove the ascent of the toxin in the cord a sizable section of the cord was resected and the toxin put in the distal portion, but still the animals died. That the course is not affected by the site of injection was shown by the presence of a similar incubation period of well being, even when the toxin was introduced into the medulla. That multiplication within the cord does not explain the peculiar lethal effect was proved by transplantation of the injected segment. Finally antitoxin was administered intravenously prior to intraspinal injection of the toxin to rule out multiplication in the blood stream, but such animals succumbed with an excess of antitoxin in the circulating blood.

Control experiments consisted of the similar injection of other toxins, none of which caused death except diphtheria toxin, and this was due to extensive necrosis of the cord, the injection of tetanus toxin into other organs without the potentiation found in the central nervous system, and the injection of tetanus toxin into the spinal cord of other species that showed the same phenomenon to varying degrees, depending upon their sensitivity. It was found that cats require nine hundred times as much toxin injected intravenously as do guinea pigs, but when given intraspinaly one guinea pig lethal dose per kilogram causes death in all the species tested, therefore, it was concluded that resistance is proportional to the presence of some mechanism preventing the toxin from reaching the sensitive nervous tissue. These observations led to the hypothesis that tetanus toxin is fixed on reaching the central nervous system, where it is either altered or liberates a new substance which is responsible for the lethal effect and is not amenable to antitoxin.

By using cross-circulated dogs it was determined that a recipient presaturated with antitoxin lived, while the donor treated with toxin died if the mixing of the blood was done before symptoms began in the donor. But if the crossing was carried out subsequent to the onset of symptoms, the recipient and the donor died at about the same time and with similar symptoms despite the use of antitoxin beforehand in the recipient, consequently, this seemed further evidence that something other than tetanus toxin was effective in the recipient. That the quantity of toxin administered is important was demonstrated by experiments which showed that a third of a lethal dose given

intravenously caused no symptoms, but a half to three quarters resulted in characteristic symptoms.

An interesting practical observation was that barbiturates and other commonly employed respiratory depressants appeared to affect toxic animals more deleteriously than normal ones. It was considered that this was a synergistic action between these drugs and the tetanus toxin that kills essentially by respiratory inhibition. The suggestion was advanced, therefore, that such medication is not rational for the control of the convulsions of tetanus.

In regard to the efficacy of antitoxin, it was stated that this can save life if administered before injury or before symptoms develop if the dose is huge, but never after symptoms have become established. It seems that after one lethal dose of tetanus toxin is fixed, incubated and altered in the central nervous system, no amount of antitoxin can be lifesaving. The amount of antitoxin necessary in any case was held to depend on the route of entry of the toxin, for it was found that the intramuscular site of toxin injection requires ten times and the intraspinal ten thousand times the dose of intravenous antitoxin. Dr. Firor stated that preliminary animal experiments indicate that intrathecal administration of antitoxin may be more beneficial than is the intravenous route.

As a result of these experiments the theory has been postulated that the tetanus organism develops only in the presence of already existing infection, and that the toxin then diffuses through the tissue fluids to reach the local neuromuscular end-organs and produce local tetanus, thence it reaches the blood stream and a small amount is fixed on reaching the central nervous system, but this produces no symptoms. There the toxin either is altered or alters the tissue, and tactile reflex tetanus then appears. A certain amount of this changed material reaches the systemic circulation and death results from respiratory failure. The outcome, therefore, is determined by the amount of tetanus toxin reaching the central nervous system, where it is fixed and altered.

Dr. Firor then discussed the treatment of human tetanus in the light of this work. The site of injury is determined, if possible, and infiltrated with antitoxin an hour before doing a thorough débridement. This precautionary delay was considered advisable in order to prevent local tetanus from squeezing out the toxin during manipulation. Fifty thousand units of antitoxin are administered intravenously, for this has been found an adequate dose against any conceivable infection. The fluid balance is carefully maintained, and the choice of sedatives is paraldehyde, chloral, or ether in oil by rectum.

Prophylaxis is now concerned with active as well as passive immunization, it was pointed out. Passive immunization can be conferred by 1500 units of antitoxin, which will result in a titer of 0.1 unit of antitoxin per cubic centimeter of blood for the succeeding four or five days. Active immunity as produced with toxoid has proved beneficial in army horses, and has been advocated for routine use in farmers and workers in hazardous industries as well as in soldiers. One cubic centimeter of the toxoid injected subcutaneously produces no discernible antibody response, but when followed in eight to twelve weeks with at least one more such injection there ensues a solid protection for two months to a year. Even after the immunity has worn off, subsequent administration of the toxoid results in a rapid rise of the titer, and Dr. Firor advocated such injections every three months for those constantly exposed to tetanus infection. The blood level was found to reach 5 to 15 units of antitoxin per cubic centimeter. No reactions were encountered except for

slight local soreness and there were no failures with the three injection method.

The discussion was opened by Dr LeRoy Fothergill, who explained the difference in reactions following toxoid vaccinations against tetanus and diphtheria. He stated that the latter is really due to sensitivity to the bacillary protein following repeated subclinical exposures to the diphtheria bacillus, a factor which is lacking in respect to tetanus. Although the lack of a sensitivity test comparable to the Schick test was noted, Dr Fothergill stated that this was not a serious drawback, for a properly carried out inoculation results in practically 100 per cent "takes."

Dr Fothergill could find no a priori basis for expecting that the intrathecal use of antitoxin should be better than the intravenous. He asserted that it is more difficult to reach the anterior horn cells through the vascular meninges than via the blood stream furthermore there is a local irritation of the already sensitive spinal cord. It was hypothesized however that such an irritation might increase the permeability of the blood-brain barrier and thus prove effective. Dr Firor agreed with this theory.

NOTICES

ANNOUNCEMENT

EDWARD H. HODDIE, M.D., announces the removal of his office from 515 East Broadway South Boston to 186 Dorchester Street, South Boston.

FELLOWSHIPS IN CHILD PSYCHIATRY

A limited number of fellowships have been provided by the Commonwealth Fund and by other sources for training in extramural especially child psychiatry. These fellowships are to be administered by the National Committee for Mental Hygiene through which fellows are to be assigned for one or two years to a selected child-guidance clinic, the term and plan of the fellowship to be determined by the peculiar needs of the fellows. Candidates should have had at least two years of psychiatry in an approved mental hospital in addition to other qualifications fitting them for extramural service. These fellowships come in response to a definite paucity of personnel in this field. Accordingly conditions as to age, sex, marital status and so forth must be governed by individual cases and by the nature of current demand. Requests for further information about these fellowships, and application therefor should be addressed to Dr. Milton E. Kirkpatrick, National Committee for Mental Hygiene, Room 822, 50 West 50th Street, New York City.

SOCIETY MEETINGS AND CONFERENCES

8 P.M. 2-6—American Congress of Physical Therapy Page 662, issue of May 16.

October 8-11—American Public Health Association. Page 655 issue of April 11.

October 11-12—Pan-American Congress of Ophthalmology Page 678, issue of May 12.

October 14-25—1940 Graduate Postgraduate of the New York Academy of Medicine Page 938 issue of May 30.

October 21—American Board of Internal Medicine. Page 369 issue of February 29.

January 4, 1941—American Board of Obstetrics and Gynecology Page 1064 issue of June 70.

April 21-25, 1941—American College of Physicians. Page 1064 issue of June 20.

DISTRICT MEDICAL SOCIETY

MIDDLESEX NORTH

Oct. 31

Oct. 30

BOOKS RECEIVED FOR REVIEW

The Conservation of Intelligence Theodore R. Robie. 75 pp. Montclair New Jersey privately published, 1940.
Sex in Marriage Ernest R. Groves and Gladys H. Groves. 750 pp. New York Emerson Books Inc., 1940. \$2.00.

Psychological and Neurological Definitions and the Unconscious Samuel Kahn. 219 pp. Boston Mador Publishing Co. 1940 \$2.00.

The March of Medicine Edited by the Committee on Lectures to the Lany of the New York Academy of Medicine. 168 pp. New York Columbia University Press, 1940 \$2.00.

Social and Biological Aspects of Mental Disease Benjamin Malzberg. 360 pp. Unica New York State Hospitals Press, 1940. \$2.50.

Principles of Surgical Care Shock and other problems Alfred Blalock. 325 pp. St. Louis C. V. Mosby Co. 1940 \$4.50.

A Manual of Neurohistologic Technique Oscar A. Turner. 73 pp. St. Louis C. V. Mosby Co., 1940. \$2.00.

Principles of Hematology Russell L. Haden. Second edition 362 pp. Philadelphia Lea & Febiger 1940. \$4.50.

Studies from the Rockefeller Institute for Medical Research Vol. 115 622 pp. New York The Rockefeller Institute for Medical Research 1940. \$2.00.

The Era Key to the USP XI & NF VI Revised by Lyman D. Fonda. Fifth edition. 320 pp. Newark Haynes & George Co., Inc. 1939 \$1.00.

The Diagnosis and Treatment of Pulmonary Tuberculosis John B. Hawes, 2d and Moses J. Stone. Second edition 260 pp. Philadelphia Lea & Febiger 1940. \$2.75.

An Introduction to Biochemistry William R. Fearon. Second edition. 475 pp. St. Louis C. V. Mosby Co. 1940 \$3.75.

BOOK REVIEWS

Ptoses gastriques et coliques doctrine—clinique thérapeutiques M. Chiray and P. Chêne. 270 pp. Paris: Masson et Cie 1939 75 Fr fr.

The authors begin by deploring the frequency and carelessness with which the diagnoses of ptosis of the stomach and colon are made, since this diagnosis predicates a long and rather rigorous therapeutic regime. Nevertheless their own criteria for making the diagnosis may be open to criticism. The monograph on the whole is a rather verbose discussion of the various aspects of this subject which although taken up systematically offers very little that is new or enlightening. Some of the case histories presented make the treatise easy to read. The volume should be of interest to gastroenterologists as indicating the point of view which their authoritative French confreres have on this subject.

Diagnosis and Management of Diseases of the Biliary Tract R. Franklin Carter Carl H. Creene and John R. Twiss. 432 pp. Philadelphia Lea & Febiger 1939 \$6.50.

The authors present a large mass of data in support of their hypothesis that the gall bladder and biliary tract are the sources of many gastrointestinal symptoms of vague nature even though the gall bladder is not grossly or obviously diseased. They describe the gall bladder and the biliary tract in various states of "biliary dyskinesia" as producing many of the common symptoms of functional

digestive disease and advocate the treatment of such symptoms by bland low residue diets, either rich or low in fats, by antispasmodics and sedatives, by attention to bowel habits and by repeated therapeutic duodenal drainage.

There can be no argument with that part of the authors' work dealing with physiology and the application of diagnostic methods. The section on surgery covers well the present day thought on surgical practice in diseases of the gall bladder and biliary tract.

On the other hand, there can be and is a vigorous school opposed to the principal thesis of the book, namely the treatment of so-called non-calculous cholecystitis or 'biliary dyskinesia'. Many of the conditions which they ascribe to the biliary tract could, with equal justice, be ascribed to other parts of the digestive apparatus and could be treated with equal effectiveness by ignoring the liver and its appendages and concentrating on the presenting symptoms and the more obvious functional disturbances of the gastrointestinal tract as a whole.

The authors believe in prescribing low cholesterol diets, and report a lowering of the blood-cholesterol level and symptomatic improvement on such diets. As attractive as this theory may be, the reviewer is of the opinion that there is no good reason to believe that the lowering of the blood-cholesterol level should improve gall bladder function. Low cholesterol diets are in the main low fat diets, the latter having been used for years in the management of chronic gall bladder disease. If cholesterol can be absorbed from the gall bladder wall or from precipitated cholesterol in the gall bladder, a more likely approach would appear to consist of stimulation of bile flow by chologogues or high fat diets.

A Symposium on the Blood and Blood Forming Organs
By fifteen authors. 264 pp. Madison, Wisconsin University of Wisconsin Press, 1939. \$3.50

This volume deals with most of the material presented at the Institute for the Consideration of the Blood and Blood Forming Organs, held at the University of Wisconsin Medical School on September 4, 5 and 6, 1939. The institute, which lasted three days, was a brilliant success, both in the size, type and enthusiasm of the audience and in the quality of the subjects presented. Minutes of hematological morphology, so commonly discussed at similar European conferences, were for the most part set aside for considerations of the physiological concepts of disease.

The volume is highly recommended to the many physicians who have more than a passing interest in hematology. A charming discussion by Meulengracht on the history of hematology is followed by an erudite and important article on the porphyrins by Watson. Watson's style is a bit formidable but the article is worth digging through. Rhoads presents his comprehensive studies on what he chooses to call 'aplastic anemia' or 'refractory anemia'. Many diverse conditions are indiscriminately grouped in this category, but one must credit the writer with the brilliance of his concepts and his ability to find 'least common denominators' for apparently diverse conditions. Heath gives a synopsis of his work on anemia due to iron deficiency. Minot presents an abstract of his ideas on the anemias of nutritional deficiency, and Diamond gives a didactic discussion of the erythroblastic anemias. Then follow brilliant papers by Meulengracht on "Some Etiological Factors in Pernicious Anemia" and by Haden on "The Nature of Hemolytic Anemia". The latter is a comprehensive article discussing thoroughly the question of the spherocyte and the fragility test. Furth gives an excellent presentation of experimental leukemia

with its human correlations, and Forkner has a well documented article on monocytic leukemia. In his article on Hodgkin's disease, Krumbhaar presents some new work utilizing tissue-culture technique, if confirmed, this preliminary investigation would seem to indicate an infectious rather than a malignant basis for the condition. Doan has a very stimulating article on the reticuloendothelial system, in which are discussed such apparently unrelated subjects as hemolytic anemia, thrombocytopenic purpura, "primary splenic granulocytopenia" and monocytic leukemia, the spleen is said to be the center for these diverse conditions. Downey has a good morphological discussion of infectious mononucleosis, and the subjects of polycythemia and of marrow cultures are discussed by Reznikoff and Osgood respectively. Eagle's presentation of the "Blood Coagulation Problem" is excellently done and contains an extensive bibliography.

All in all, the volume is well worth owning, giving as it does much of the present-day work in the numerous fields of hematology. This first American Institute of Hematology indicates the greatly increased interest in the subject in this country and may well be the prelude to other equally successful gatherings in this field.

Bacteriology Clin Medica 22 William W Ford. 207 pp. New York and London Paul B Hoeber, Inc., 1939. \$2.50

This small book, which comes to join the excellent *Clin Medica* series on medical history, sets forth in a succinct but capable and interesting manner the significant theories and discoveries whereon modern bacteriology rests. In accord with the purpose of this series, which is to make available primers or straightforward statements of the important historical facts in each subject, the author of the present volume confines himself largely to outlining those fruitful investigations which have given impetus from time to time to broad advances in knowledge.

Thus we find recounted the development of optical science, which like so many others expanded rapidly in the congenial atmosphere of the late Renaissance. Here the contributions of Anton van Leeuwenhoek to the perfecting of simple lenses and Galileo's invention of the compound microscope are emphasized. Although such improvements in magnification as early as 1683 enabled Leeuwenhoek to see and describe bacteria so clearly that no doubt can exist concerning the accuracy of his observations, scientists of the eighteenth century surprisingly failed to take advantage of this momentous discovery. Their most notable offering, perhaps, is to be found in the experimentation of Spallanzani, which should have ended the impeding controversy over spontaneous generation. Jenner's magnificent experiments, not reported until the very end of the century, and never to be too often called to mind, are possibly given inadequate treatment in view not only of their great practical value but because of the immunological principles which they illuminate so brilliantly.

The remainder of the book is largely occupied with the work of the great masters, Pasteur and Robert Koch, and with the immediate harvest of new knowledge to which this gave rise. The story is, of course, familiar to all bacteriologists, but Professor Ford has told it well, and it is of value to have here readily available. A final chapter on later developments reviews most of the important conceptions in both bacteriology and immunology established by the researches of the first quarter of the present century.

Not the least pleasing feature of the book is the rather extensive and well arranged bibliography.

Housing Yearbook 1939 Edited by Coleman Woodbury
240 pp. Chicago National Association of Housing
Officials, 1939 \$3.00

Poor housing, disease and poverty are an anti-social tri-umvirate that have always moved together. As physicians have become more socially aware of the interrelatedness of social phenomena they have also become more concerned with doing what they can, both as citizens and as physicians, to break up this alliance.

This useful volume describes the federal state and local activities in housing and reviews the work of the Federal Housing Administration and of the Home Owners Loan Board, and the housing activities of the Farm Security Administration. It concludes with a directory of housing agencies.

There are four very illuminating chapters written by Nathan Straus, Stewart McDonald, J. H. Fahey and W. W. Alexander.

It is impossible, in a brief review to give the reader any conception of the range of useful facts to be found in this little volume. Here are a few selected at random, on the Home Owners Loan Corporation (HOLC). In the low of the depression there were a thousand foreclosures a day. The HOLC took over mortgages totaling \$932,000,000 from banks and trust companies, \$767,000,000 from savings and loan associations, \$192,000,000 from financing and mortgage companies and \$164,000,000 from insurance companies. Thus the HOLC assisted these institutions in remaining liquid. This permitted the institutions to grant leniency to other distressed home owners and to lend to needy borrowers. The HOLC paid \$229,000,000 to wipe out delinquent taxes and saved home owners \$175,000,000 in interest by virtue of the Government's greater borrowing power. Of course, the HOLC has had to foreclose on some properties. But in nearly 90 per cent of such cases the "owners" were more than a year in arrears on principal and interest payments in 63 per cent, the period was more than a year and a half. Twenty per cent of the foreclosures were voluntary, an estimated 18 per cent of the foreclosed properties being either abandoned or virtually so. J. H. Fahey, chairman of the board recommends that the HOLC, rather than expending its revenues on hopeless cases, should now aid only those who have a real possibility in saving their homes, "so that the corporation may wind up its operations without great loss to taxpayers."

The other articles are similarly crammed with fascinating facts on housing which are of substantial value to all students of these problems. The articles make clear to doubters that our housing problem is in the hands of able, conscientious administrators—all of which should give us confidence for the future.

Fractures Paul B. Magnuson Third edition. 511 pp.
Philadelphia: Montclair and London: J. B. Lippincott
Co. 1939 \$5.00

The author explains that the purpose in writing this text was "to meet the needs of the man who first sees the fracture" which limits the scope of the book to a more or less elementary discussion. Such a viewpoint has its advantages and disadvantages, both of which become apparent. The groundwork is well presented. Anatomical descriptions are worked out to explain the mechanical distortion which follows loss of skeletal support at various locations. The discussions of treatment are clear outlining varieties of methods in general use. There is a wealth of clinical suggestion, warning the practitioner of complications which may be anticipated and suggesting meth-

ods to escape them. Descriptions of operative technique avoid minute details and are limited to the basic principles.

On the other hand, fracture treatment is advancing so rapidly that even a general text should include an ampler discussion of progressive methods than is here afforded. Intra-articular fractures of the neck of the femur for example, are discussed so indecisively that one turns back to the title page to see if it is actually 1939 and not 1929. More space is given to the Whitman spica method than to Smith-Petersen's or Moore's nailing. We search in vain for reference to walking irons on casts or to skeletal traction for fracture-dislocations of the cervical vertebrae. Not a word of mention is given to the principles of double-pin fixation advocated by Anderson. Neither drilling nor nailing of slipped, upper femoral epiphyses is suggested as a possibility, the old-fashioned clavicular cross being the only method mentioned for this common fracture. Such omissions detract from the value of a text of this sort.

Manual of Urology R. M. LeComte. Second edition.
295 pp. Baltimore: The Williams & Wilkins Co.,
1939 \$4.00

In this book the author has succeeded in presenting a remarkably concise and well-balanced treatise on diseases and disorders of the genitourinary organs. No condition of importance has been omitted and the opinions expressed by him are representative of those which are commonly held by urologists. Although these opinions are stated emphatically and somewhat didactically the author has departed from this attitude when commenting on subjects which are not yet clearly understood.

The reviewer noted only two statements with which he would not agree. On page 262, in the paragraph on treatment of testicular tumors, the author writes "In cases with inoperable metastases, deep x-ray therapy may afford striking relief over long periods of time." The reviewer believes that the value of deep x-ray therapy as a preventive of the development of such metastases has been fully established. On page 263 it is stated that simple puncture of a hydrocele "is fraught with the dangers of hemorrhage and infection." In the reviewer's experience these complications occur but rarely.

Aside from these two criticisms, the reviewer has nothing but praise for this manual and believes it will prove a valuable reference book for those who wish to acquire a general idea of genitourinary diseases.

Maternal Care and Some Complications The principles of antepartum, intrapartum and postpartum care and of the management of some serious complications
Edited by F. L. Adair 194 pp. Chicago: University
of Chicago Press, 1939 \$1.50.

The first section of this little book is on maternal care and it is a very clear concise exposition of the care that any woman who is pregnant should receive from her physician. The second section takes up a few of the more common complications of pregnancy: the toxemias, obstetric hemorrhages and puerperal infection.

If this book were placed in the hands of every practitioner of medicine who is doing obstetrics and if he would honestly and conscientiously follow out the suggestions and technique so carefully outlined, there is no question that a great improvement in obstetrics as practiced in this country would follow.

Psychobiology and Psychiatry: A textbook of normal and abnormal human behavior Wendell Muncie. 739 pp. St. Louis C V Mosby Co., 1939 \$8 00

This book, containing a foreword by Adolf Meyer, represents, as is stated in the preface, an attempt to put before students the concepts, teaching and working methods of the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital. The important role which this clinic has played in psychiatric thought in America and abroad is too well known for comment. A textbook that presents the teaching methods of the clinic will be viewed with interest by all psychiatrists.

The book is composed of four parts. Part one deals with the study of normal behavior—the 'material' of Adolf Meyer's ergasiology. After a brief historical account, and a presentation of what the author recognizes as the philosophical bases of psychobiology, ninety-three pages are devoted to an elaboration of Meyer's familiar students' personality study. Part two deals with abnormal behavior—the reaction types, or pathergasias, of the Meyerian school of psychiatry. Part three, consisting of seventy-seven pages, is allotted to treatment. Part four is a tabulated survey of the development of the concepts underlying clinical states which the author designates as reaction sets. This section is poorly arranged. Many of its one hundred and eighty-six pages are unnecessarily blank. For example, the part concerned with parergasia (schizophrenia) might well have included references to Clouston's "dementia of adolescence" and to Carl Wernicke's "sejunction"—a forerunner of Bleuler's schizophrenia concept.

It is the reviewer's opinion that the book is not a complete textbook of psychiatry to be compared with that of Henderson and Gillespie. It is a book which, as has been stated, presents the conceptions, teaching and working methods of the Henry Phipps Psychiatric Clinic—as they have developed under the guidance of Adolf Meyer.

Physiotherapy in Medical Practice Hugh Morris. 276 pp. Baltimore The Williams & Wilkins Co., 1939 \$4.50

"This book is not intended for the specialist but for the practitioner who wants to know what he can expect from electrotherapy and who prefers to prescribe the treatment to be given to his patients instead of leaving the choice to a masseuse, as is so often done." This quotation from the preface not only designates the group of physicians for whom the book was written but also implies a just criticism of the others who stoop to the technician not only for the technical application of physical therapy but even for the medical judgment to be exercised in choosing a given physical agency or modality.

In relatively few pages the author has managed to do justice to the physics, physiological effects, indications and technic of application of the various measures commonly employed by the average physical therapist. This was made possible by the author's knowledge of the underlying principles of the subject matter which he covers and by his economical style of writing.

Certain minor improvements can be suggested. His explanation of induction is altogether too brief and somewhat involved, considering that it represents the most important method of generating electricity, the latter being the backbone of the entire treatise. To the faradic coil, which forms an important part in the testing of paralysis, he has allocated only five lines, while a page is devoted to the dynamo-and motor current. In discussing the static

machine he speaks of the principle of induction but makes no reference to that of friction, notwithstanding the fact that the latter gives the initial charge. Again, poor judgment has been used in the allocation of pages. The static machine is used very little as compared with short wave apparatus, yet the consideration of the former takes up ten pages whereas that of the latter is given only seven. However, these shortcomings are of minor importance compared with the advantages that this book has over other texts of similar nature. It is brief, yet covers its ground well and fulfills the aim of its author, namely, to supply the general practitioner with the necessary knowledge of principles, skill of application and sound judgment to be exercised when prescribing and applying the various measures of physical therapy.

Modern Clinical Psychiatry Arthur P. Noyes. Second edition. 570 pp. Philadelphia and London W B Saunders Co., 1939 \$5 00

No book deserves the word "modern" in its title more than this, because it rejects *en masse* the accumulated learning of a generation or two of scientists and presents its current point of view exclusively even though tempered. The long line of doctors who insisted that persons with mental disease were sick and should have medical care at once disposed of forthwith. For instance on page 89 it is stated "The minor and many of the major psychoses should not be considered as 'diseases' in the usual sense of the term but as an individual's unwholesome, poorly adjusted methods of reaction to his particular stresses and problems."

What we call mental disease is therefore not a disease entity but an individual problem in human behavior, a problem in personality maladjustment." All will, of course, agree with the statement (page 95) "Mind is an integral function of the organism and can not be split up into components", but shall we also accept the taboo, "We must therefore not think of it as a sort of machine different parts of which sense, perceive, imagine, remember, associate, reason about, desire, choose etc."? Krepelin is not included in the bibliography at the end of the chapter, "Symptoms of Mental Disease", in fact, the old gods are fairly well dethroned. The new ones are accepted with the zeal of a missionary. There is even a paragraph on psychogenesis in the description of paresis.

This is a good book, well written and showing much erudition. It perhaps expresses the high tide of the psychological approach to mental disease, certainly advancing medical knowledge in no other way.

An Introduction to Genetics A H Sturtevant and G W Beadle. 391 pp. Philadelphia and London W B Saunders Co., 1939 \$3 25

The authors treat the subject of genetics as a mathematically formulated subject that is logically complete and self-contained. Readers should be familiar with elementary biology and have an understanding of the simple laws of probability to appreciate the handling and interpretation of the genetic data contained in this book. The reviewer believes that the material is presented in a noteworthy, concise manner wholly consistent with the effort to teach students the fact that genetics is largely a science of ratios. At the end of each chapter the authors give problems well calculated to arouse interest and enthusiasm on the part of students. There are many good diagrams and figures.

